The Social Contract

Vol. XIII, No. 3 Spring 2003

Highlights

Our feature section for this issue has been assembled by Guest Editor John Attarian. It includes several essays and articles by Herman E. Daly, perhaps the 'father' of ecological economics:

Steady-State Economics: Concepts, Questions, Policies

Uneconomic Growth in a Full World

Population and Economics

Selected Growth Fallacies

Ultimate Confusion: The Economics of Julian Simon

Globalization and Its Inconsistencies

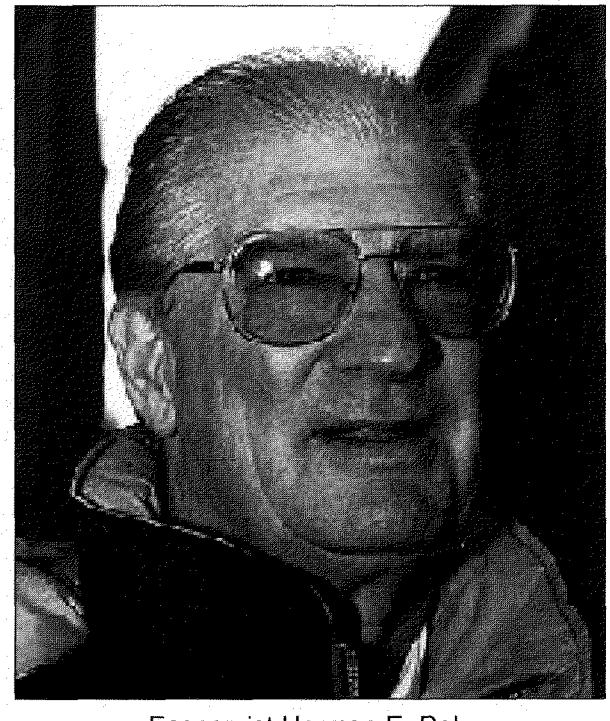
Policy, Possibility, Purpose

Also Articles by:
Leon Kolankiewicz
Edwin S. Rubenstein
Don Barnett

New Books are reviewed by Carl F. Horowitz and Wayne Lutton

Ecological Economics

Highlighting the Work of Herman Daly



Economist Herman E. Daly

Leon Kolankiewicz reports on extensive research into the relationships between population growth, energy use, and damage to the environment.
See page 208.

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About THE SOCIAL CONTRACT

The English philosopher John Locke, whose thinking helped inspire the American revolution, said that society should be governed by an understood set of values he termed "the social contract." Under the social contract, governments have obligations to their citizens, and citizens have responsibilities to society.

Most public issues are basically moral and ethical ones. What is the right thing to do? How do we decide what we think is right? When "rights" collide, which ones take precedence? The concept of the social contract helps us sort out the difficult issues confronting American society today and helps us find balance.

Each quarter THE SOCIAL CONTRACT journal examines trends, events, and ideas that have an impact on America's delicate social fabric. Key topics addressed by this journal:

- *Human population issues, including absolute size, rate of growth, and distribution. Do cherished American ideals prosper or suffer through further population growth?*
- *Immigration issues. In order to best facilitate meeting the highest goals of the American people, (1) how many immigrants should we admit? (2) who should be admitted? and (3) how can we humanely enforce the rules?*
- *Language, assimilation, culture, and national unity considerations. What shared values are necessary to the maintenance of our social contract?*
- *The balance of individual rights and civic responsibilities. Since the previous issues are so often framed in terms of rights, what are the balancing obligations?*
- *Other nations' efforts at creating and guarding their own social contracts. What practical insight can be gained from observing the failures and successes in nation-building by other societies?*

THE SOCIAL CONTRACT explores these complex and interrelated issues with articles, essays and book reviews that vary greatly in outlook and philosophy. We encourage a wide spectrum of opinion as we publish contributions from many vantage points. The opinions expressed by the writers are not necessarily those of the editors or publisher.

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THE SOCIAL CONTRACT

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A Note from the Editor

Jobs Americans Won't Do?

In February, American businesses cut over 308,000 jobs, adding to the more than 380,000 private-sector positions and half-million manufacturing jobs lost last year. According to the Department of Labor, for white-collar professionals, the unemployment rate stands at 8.9%. Observed Richard Yamarone, an economist with Argus Research Corp: "The labor market situation has deteriorated dramatically and is weighing heavily on consumer confidence and spending."

Despite the ready availability of tens of thousands of laid-off professionals, and additional thousands of highly-trained recent college graduates, state and federal government agencies from coast to coast have hired foreign workers at the expense of American citizens, using the controversial H-1B visa program.

Federal agencies that have hired H-1B non-citizen workers include: Argonne National Laboratory, U. S. Department of Defense, Department of the Air Force, Department of the Navy, Department of Veterans Affairs, U. S. Department of Agriculture, U. S. Naval Academy, Lawrence Livermore National Laboratory and the Los Alamos National Laboratories.

State governments using public money to retain foreign nationals at a time when large numbers of qualified Americans are seeking employment include: the Arizona Department of Transportation, Arizona Department of Environmental Quality, California Department of Transportation, Illinois Department of Nuclear Safety, Indiana Department of Transportation, Louisiana Department of Public Safety, Massachusetts Department of Public Health, Massachusetts Department of Revenue, Minnesota Department of Transportation, New Jersey Department of Transportation, New York Public Library, Tennessee Department of Transportation, and the Virginia Department of Corrections.

Under Republican Governor Jeb Bush, the state of Florida has been a prominent employer of H-1B visa holders. The Florida Department of Corrections, Florida Department of Environmental Protection, Florida Department of Health, and Florida Department of Transportation are among the state agencies that have hired foreign professionals.

The state of Ohio, led by Republican Governor Bob Taft, presents a case study of the types of good jobs going to foreigners instead of Americans. At least eight Ohio state agencies have hired H-1B workers, most of them citizens of India and the Pacific Rim countries of China, Korea, and Taiwan. The Ohio Department of Job & Family Services has hired a number of foreign computer programmers and analysts, at starting salaries ranging from $50,336 to over $64,000.

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When asked why his department hires foreign citizens for well-paying jobs, the Director of Job & Family Services, Tom Hayes, replied, "We here believe in the American dream...but we can't say that we have to hire people who are American citizens."

The H-1B visa program, a provision of the 1990 Immigration Act, was created to allow American companies to hire foreign professionals at a time when the high-tech industry cried that a huge labor shortage was looming. Although the shortage never materialized, Congress has expanded the program from an initial 65,000 temporary visas, good for up to six years, to 115,000 visas in 1999, to 195,000 foreign workers admitted annually through this year.

Under the H-1B program, employers are not required to document a shortage of qualified Americans for a particular job opening. They do have to file an application fee of $1,000 per employee, which is simply written off as a cost of doing business. In the case of government agencies, American tax dollars pay the fees used to hire foreign workers.

Jobs Americans Won't Do?
Examples of Ohio State Jobs Filled by Foreigners

Agency	Job Title	Yr Salary
Administrative Services	computer programmer	$52,873
Administrative Services	systems analyst	$52,873
Agriculture	pest control specialist	$31,990
Health	epidemiology investigator	$50,336
Health	computer programmer	$45,801
Health	researcher	$41,600
Job & Family Services	programmer/analyst	$55,411
Job & Family Services	programmer/analyst	$58,156
Job & Family Services	programmer/analyst	$50,336
Job & Family Services	programmer/analyst	$52,873
Job & Family Services	programmer/analyst	$64,043
Mental Health	programmer/analyst	$48,027
Mental Health	psychiatrist	$114,920
Mental Health	psychiatrist	$133,036
Mental Health	psychiatrist	$136,323
Mental Retardation	systems analyst	$52,873
Rehabilitation/Corrections	psychiatrist	$131,580
Rehabilitation Services	claims adjudicator	$31,990

Source: Ohio State Agencies

Corporations and government agencies like to hire foreigners, since they are often compliant, and private companies can offer them lower wages and fewer benefits than Americans would expect for similar work. The pay-off for foreign workers is that they receive higher pay in the United States than they would at home, and employers often sponsor them for permanent residence. For hundreds of thousands of non-citizens, the H-1B program has become a backdoor entry into America.

The H-1B program is not the only way that non-citizens can work legally in the United States. Jessica Vaughan, a senior policy analyst with the Center for Immigration Studies, discovered that more than 715,000 foreigners were issued employment visas in 2001 (the most recent figures available). Another 110,000 non-immigrants received permission to work after they arrived in the United States.

Congress has the authority to end these practices. H-1B comes up for review and renewal of the higher visa limits later this year. The various non-immigrant work visa programs can simply be terminated. But the public has yet to make this a pressing issue.

More information about foreign employment visa programs (H-1B and L-1) can be found at some of the websites (CIS, NumbersUSA.com, FAIR) listed on our bulletin board on the following page (152). A site devoted to this issue is www.zazona.com, which includes a database listing companies that hire foreigners for American jobs.

* * *

Edward Abbey once described support for endless economic growth as "the economics of the cancer cell." Yet the assumption that economic growth is the wellspring of human progress is a belief endorsed by all shades of opinion. In this issue, we are pleased to present the contrarian views of Professor Herman Daly of the University of Maryland. We thank guest editor John Attarian for preparing this special feature. If nature is to survive, the global economy will have to stop growing.

WAYNE LUTTON, PH.D.
Editor

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The Bulletin Board

Immigration on the Internet

Here are some additional sites that readers may find of interest. Listing them here does not imply that THE SOCIAL CONTRACT endorses the material on any specific site.

- The Federation for American Immigration Reform (FAIR): www.fairus.org.
- Diversity Alliance for a Sustainable America at www.diversityalliance.org.
- Immigration by the Numbers: www.numbersusa.com.
- ProEnglish: www.proenglish.org.
- Californians for Populations Stabilization (CAPS): www.capsweb.org
- A new voice for population/environment issues: www.sprawlcity.org.
- Center for Immigration Studies: www.cis.org.
- *Limits to Growth* edited by Brenda Walker: www.LimitsToGrowth.org.
- Friends of Immigration Law Enforcement: www.fileus.com.
- www.ImmigrationsHumanCost.org.
- Alternatives to Growth Oregon at: www.agoregon.org.
- National parks at our southern border are being overrun by an overwhelming number of illegal aliens: www.desertinvasion.us.
- Comments from Peter Brimelow, Joseph Fallon, and others: www.vdare.com.
- Colorado Alliance for Immigration Reform (CAIR) and links to other state-based organizations: www.cairco.org.
- Carrying Capacity Network: www.carryingcapacity.org.
- Negative Population Growth: www.npg.org.
- California Coalition for Immigration Reform: www.ccir.net.
- Philip Martin's *Migration News:* www.migration.ucdavis.edu.
- Professor Norman Matloff: www.heather.cs.ucdavis.edu /pub/Immigration/Index.html.
- Midwest Coalition for Responsible Immigration: www.enteract.com/~mcri97.
- Sierrans for U.S. Population Stabilization: www.susps.org.
- *People and Place* is published in Australia by the Centre for Population and Urban Research: www.elecpress.monash.edu.au/pnp.
- Canadian Immigration Reform Committee: www.canadafirst.net.
- Terminology is important: www.illegalaliens.us.
- Voices of Citizens Together: www.americanpatrol.com.
- Council of Conservative Citizens: www.cofcc.org.
- Columnist Samuel Francis: www.samfrancis.net.
- The Biocentric Institute: www.iapm.org/biocenter.html.
- Stalking the Wild Taboo: www.lrainc.com/swtaboo/.
- ProjectUSA: www.projectusa.org.
- The European Forum for Migration Studies: www.uni-bamberg.de/~ba6ef3/home.html.
- Floridians for a Sustainable Population: www.flsuspop.org.
- Population and Sustainability: www.ecofuture.org/populat.html.
- American Renaissance: www.amren.com.
- *Mankind Quarterly:* www.mankind.org.
- Federal Publications (developments in immigration law): http://www.fedpub.com/fedpub/immigrat.htm.

E-mail addresses for pertinent organizations:

- Center for Immigration Studies (CIS): center@cis.org.
- Negative Population Growth: npg@npg.org.
- Carrying Capacity Network: ccn@igc.apc.org.
- Californians for Population Stabilization (CAPS): caps@capsweb.org.

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Herman Daly's Ecological Economics

An Introductory Note

by John Attarian, Guest Editor

Mainstream opinion has it that economic growth, the democratization of affluence, and ever-increasing consumption are the formula for individual and social happiness. A thoughtful and well-informed minority emphatically disagrees. Few have contributed more to this dissent than Herman E. Daly, widely regarded as the founding father of ecological economics.

Born in 1938, Daly earned his B.A. at Rice University (1960) and Ph.D. at Vanderbilt University (1967). From 1968 to 1988 he taught economics at Louisiana State University. Then he served as Senior Economist in the World Bank's Environmental Department until 1994, when he became a professor at the University of Maryland's School of Public Affairs, his current position.

As a graduate student, Daly believed that growth would solve mankind's problems, but three experiences radically transformed his outlook. He studied under the economist Nicholas Georgescu-Roegen (1906-1994), whose book *The Entropy Law and the Economic Process* (1971) explained the decisive economic importance of the second law of thermodynamics (the entropy law): in a closed system, the availability of useful energy always declines. Georgescu-Roegen argued that the economic process transforms natural resources into waste — that is, transforms matter-energy from a state of low entropy into a state of high entropy. Georgescu-Roegen's great contribution, Daly observes, was "reuniting economics with its biophysical foundations." Teaching in Brazil in the late 1960s, Daly observed explosive population growth firsthand. Reading Rachel Carson's *Silent Spring* was also influential.

Daly maintains that the economy is a subset of an ecosystem which is finite, non-growing, and materially closed (i.e., no matter enters or leaves it) and that it uses the environment as a source for material inputs and as a sink for wastes. Unfortunately, he argues, the economy has become so large relative to the ecosystem that human activity is undermining the ecosystem's ability to support human life. Resource finitude and the entropy law make perpetual economic growth impossible. Accordingly, we must abandon growth (quantitative enlargement) in favor of development (qualitative improvement), and of a "steady-state economy" which can be sustained long-term (though not forever), in which population and capital stocks are constant, and throughput (the flow of low-entropy matter and energy which is taken from the environment and transformed into high-entropy wastes) is minimized.

Equally committed to social justice, Daly favors narrowing income inequality with a negative income tax and limits on the largest incomes, which he argues will help reduce drawdown of finite resources, make society more equitable, help the poor more effectively than does today's welfare state, and help shift our politics from a plutocracy to a democracy. One of his criticisms of the obsession with growth is that it enables society to evade tough questions about wealth redistribution and population control.

Daly argues that society should set overall limits on the scale of economic activities and the distribution of incomes, but allow markets free play within those limits. Thus he endorses, for example, population control through the system of tradeable birth licenses propounded by the economist Kenneth Boulding.

As a serious Protestant Christian, Daly grounds both his socioeconomic liberalism and his

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environmentalism in the Christian injunctions to love one's neighbor and God's Creation.

Daly's vivid awareness of the reality of limits is sharply at odds with mainstream economics, which lives in an artificial alternative universe of abstract economic models and treats limits as fictions and resources as unimportant. Sharply criticizing these failings, he is especially devastating about the "flat-earth" perspective of the late Julian Simon.

Daly's first book-length statement of his ideas, *Steady-State Economics: The Economics of Biophysical Equilibrium and Moral Growth* (1977), attacks the ideology of economic growth and argues that biophysical limits to growth make shifting to a steady-state economy imperative. He describes a steady-state economy and offers proposals for creating and maintaining it. A second edition in 1991 adds many later essays and book reviews on growth and sustainability. Daly and Protestant theologian John B. Cobb, Jr. co-authored *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future* (1989), which calls for replacing the conventional economic assumption of man as "economic man," a utility-maximizing, isolated individual, with an assumption that man is a whole person who lives in a community and whose happiness depends somewhat on the welfare of others; and offers many specific policy changes in trade, population, land use, agriculture, industry, labor, and taxes to restore community, protect the environment, and promote a way of life which is sustainable long-term. It also presents an "Index of Sustainable Economic Welfare" as a better measure of economic well-being than "Gross Domestic Product." Updated in a second edition (1994), *For the Common Good* is the most comprehensive and accessible presentation of Daly's thought and an excellent choice for general readers.

Also highly recommended is Daly's rigorous but readable *Beyond Growth: The Economics of Sustainable Development* (1996), which covers the theory of ecological economics, measures of sustainable economic output, sustainable development policy, population, international trade, pioneering thinkers in the economics of sustainable development, and the religious and ethical groundings of ecological economics. A more recent collection of short articles and book reviews, *Ecological Economics and the Ecology of Economics* (1999), mixes polemical but justified digs at flat-earth economics and critics of the environmental movement, sophisticated criticisms of mainstream economic growth theory, and searching reflections on human nature and the human purpose.

In addition, Daly edited three volumes of essays criticizing growth ideology and presenting central ideas in steady-state economics. *Toward a Steady-State Economy* (1973), his first anthology, featuring essays by C. S. Lewis, Cobb, E. F. Schumacher, Boulding, Garrett Hardin, and Georgescu-Roegen, addresses biophysical, social, and ethical constraints on growth and the political economy of the steady state. Daly expanded it into *Economics, Ecology, Ethics: Essays Toward a Steady-State Economy* (1980), with additional essays by Georgescu-Roegen, Schumacher, Hardin, and Boulding, and more essays on limits, affluence, and energy use. An introductory essay by Daly helpfully surveys the entire subject. *Valuing the Earth: Economics, Ecology, Ethics* (1993), which Daly co-edited with economist Kenneth Townsend, retains Daly's excellent introduction and adds still more essays to reflect a shift in the focus of steady-state thought from economizing on resources to economizing on waste sinks.

Only Beyond Growth, Ecological Economics and the Ecology of Economics, the 1994 edition of *For the Common Good*, and *Valuing the Earth* are still in print. Hopefully, Island Press, publishers of the second edition of *Steady-State Economics*, will bring it back.

Daly co-founded the scholarly journal *Ecological Economics* in 1989 and still serves as an associate editor. His thought is slowly attracting appreciative notice, and some honors have come his way. *For the Common Good* won the 1991 Grawenmeyer Award for Ideas for Improving World Order, and in 1996 Daly received the Honorary Right Livelihood Award and the Royal Netherlands Academy of Arts and Sciences Heineken Prize for Environmental Science.

Integrating theology, ethics, science, and economics, Daly's ecological economics is the kind of comprehensive vision we too seldom see, and one of the most important and promising intellectual developments of our time. Our selection of Daly's works is a concise yet comprehensive introduction to his thought. May he find the audience he deserves. ■

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A Conversation with Herman Daly

by John Attarian

The Social Contract chose to feature Herman Daly in this issue and invited me to assemble some of his writings for presentation. As guest editor, I was also asked to interview Dr. Daly, which I happily did. Over several days the following "conversation" took place by e-mail.

Our Situation and Our Prospects

John Attarian: *Professor Daly, you've maintained that resource finitude and entropy law make sustained growth impossible and that the economy is becoming unsustainably big relative to the ecosystem that supports human life. Have we overshot optimal size, and what evidence would you give for this?*

Herman Daly: I suspect that we have. The work I did with John and Clifford Cobb on the Index of Sustainable Economic Welfare indicates that we have overshot the optimum — environmental and social costs are increasing faster than production benefits as we grow physically. Also the work that people have done on ecological footprint leads to a similar conclusion. Of course empirical measures are difficult and fall short of proof. To me the most convincing argument comes straight from economics: diminishing marginal benefit and increasing marginal costs. We use growth to satisfy our most pressing wants first, and we achieve growth by employing our most productive resources first. Consequently marginal benefits of growth fall while marginal costs rise. If the curves have not yet crossed, they soon will.

JA: *We're burning the candle at both ends — depleting sources and overloading waste sinks. Is one more dangerous, more likely to take a toll on human life sooner or be permanently ruinous, than the other?*

HD: The sinks seem to be more limiting right now. That could change. I think the reason is that sinks tend to be open access commons, while sources are usually private property. As we know, the incentive is to overexploit open access resources.

JA: *On the source end of throughput, warnings are multiplying among petroleum geologists that some time in the next decade or so, annual world oil extraction will peak and then irreversibly decline.*

HD: I think they are right. And our dependence on petroleum keeps growing.

JA: *How about water?*

HD: Scarcity is increasing, and some form of higher price is inevitable. Privatizing the sources of water supply seems to me a bad way to do it. I'd much rather see a public corporation charge for water with profits going into the public treasury, permitting reduction of other taxes, especially the most regressive.

JA: *Is there still time to make a transition to a steady-state economy, or is it too late?*

HD: The steady state that we can now sustain is inferior to the one we could have had if we had started earlier. There is still a lot of natural life support and beauty to save, but it diminishes every year that we persist in pushing uneconomic growth.

JA: *If we achieved an SSE, could we keep it going for long at anything like current population levels? Or have we already depleted sources and filled sinks too much for an SSE to endure except at much lower population and living standards?*

HD: I think lower levels will be necessary. We may, by a "fallowing" type of investment in natural capital, rebuild life-support capacity. But like all investment that requires a period of foregone consumption.

JA: *What do you make of our current slump and iffy recovery? Is it purely cyclical? Uncertainty over war and terrorism? Is the growth engine starting to stall?*

HD: I suspect that it is part cyclical — the crash of the info tech boom and all the hype about a virtual economy; and part secular — the loss of real growth

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possibilities for employing manmade capital productively in a world of diminishing complementary natural capital.

JA: *You've made a persuasive case for reversing population growth, so as not to reduce carrying capacity and bring on calamity. Yet, populations all over the world are aging and will require more taxpayers and caregivers. We may face a hideous dilemma: keep populations growing and go farther out on a limb, or lower birth rates and have the elderly population implode. What are your thoughts on that?*

HD: A problem to be sure. But rather than grow farther out on the limb I think we should structure things so that the able elderly take on more of the burden of caring for the disabled elderly. A stationary population with a low death rate is bound to have a high average age. We need to accept that, along with the inevitably of death and disability as we age. I am beginning to speak from experience on this issue!

JA: *Population aging means that old-age entitlements will dominate First World domestic politics and government budgets. Meanwhile international relations are highly unstable, with nuclear proliferation and with the Middle East sliding toward real trouble, as populations in Muslim countries rise, water supplies decline, oil eventually does likewise, and Islamic fundamentalism increases. Even if we do try to shift to a steady state, how will all this complicate matters? Will there be a new push for faster economic growth in the First World, to finance the old-age entitlements, to buy off the rogue states and Islamic malcontents with aid?*

HD: Very likely, just as advocacy of growth has for a long time been motivated by a desire to avoid redistribution and "buy" peace.

II. Policy Tools

JA: *All this raises the issue of what to do. In* Eco-Economy, *Lester Brown stresses "making prices tell the ecological truth," and both you and Lester favor "taxing bads, not goods." As an economist I like these ideas. But might creating truthful prices and taxing bads in one country just accelerate the shifting of bads to countries with lower environmental standards? Might countries trying to do the right thing backslide so as to remain globally competitive? For right prices and taxing bads to work, don't we also have to attack globalization?*

HD: Indeed, globalization undercuts most national policies, especially the policy of internalizing external costs, so that prices will tell the ecological truth in so far as possible. We need tariffs to protect, not inefficient national industries, but efficient national policies of cost internalization.

JA: *To what extent is the appropriate set of policy tools a function of how far we are from optimal size? In an empty world (economy small relative to ecosystem), would internalizing externalities and taxing throughput have sufficed, but now that we've overshot optimal size, do we need to get a lot more radical in tackling scale?*

HD: Urgency is certainly a function of how far over the optimum we are, but I think controlling scale will in the final analysis require quantity restrictions rather than taxes to internalize costs. I advocate ecological taxes because they are effective in slowing scale growth and may be more politically possible than quotas, but I prefer quotas to set the scale with prices to do the allocation (rationing) of the set scale.

JA: *Given aquifer depletion, our dependence on fossil fuels, and the prospect of an oil peak and decline, are right prices, eco-taxes, and even tradeable permits enough? Might it become necessary to tackle throughput more directly, with, say, fuel rationing and municipal and county restrictions on water use?*

HD: It might. I prefer to fix the scale by quota and let the market allocate. However, the existing distribution of income is so unequal that rationing by price for vital resources may be too harsh. Do we then redistribute income to the poor, or do we remove certain vital resources from the market? Politically it often seems easier to do the latter. The former would be better in my view, but one has to worry about what is politically possible.

JA: *The need to tackle globalization suggests that restructuring the economy will be necessary in addition to taxes and permits, especially in resource intensive sectors. The interstate highway system and air travel have been important factors in creating an unsustainable way of life spendthrift of fossil fuels. What should we be doing differently in transportation?*

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HD: I think a truth-telling price for energy would straighten out our transportation system better than anything else and would concentrate efforts on that.

JA: For the Common Good *rightly points out that our industrialized agriculture is unsustainable. You call for ending government support for agribusiness (hurrah!), raising oil prices to disadvantage oil-based farming, taxing land degradation by farmers, and giving tax credits for land improvement. Are there other measures you'd recommend?*

HD: Not really — but I always learn a lot from Wendell Berry on this subject.

JA: *Should the government give inducements to encourage a return to the land and a renaissance of small family farms?*

HD: Yes, on an experimental scale. First eliminate subsidies to big agriculture.

JA: *Given the crucial importance of optimal scale at the macro level, does it not follow that we need to pay attention to scale at the individual firm and farm level also? As Berry observes, large-scale, monoculture farming rules out good husbandry of the land. Do we need additional tools to address scale of individual endeavors--antitrust? Ceilings on farm size?*

HD: Yes to anti-trust. Probably some limit on farm size as well.

JA: *How about advertising? In* The Perennial Philosophy, *with which you're familiar, Aldous Huxley maintained (p. 219) that craving is "the principal cause of suffering and wrong-doing and the greatest obstacle between the human soul and its divine Ground" and attacked advertising as "the organized effort to extend and intensify craving." And William Catton argued in* Overshoot *(p. 235) that practicing the "mandatory austerity" entailed by "ecological modesty" required making an end of "the widespread, deliberate badgering of people into wanting more, more, more." So a respectable case exists on both spiritual and ecological grounds for some sort of social control of advertising. What do you think?*

HD: Yes. A modest first step might be to disallow expenditure on advertising as a deductible expenditure in calculating profit for tax purposes. After all it is a bit silly to count the creation of the "need" for a product as a cost of its production.

JA: *Are there other sectors where we need structural reforms to help minimize throughput?*

HD: If quotas or taxes are applied at the input end of the throughput we get an across-the-board effect and should not have to go sector by sector.

JA: *You rightly dislike socialism and respect the market and market prices for their superior allocative performance. But is there a risk that eco-taxes plus tradeable permits plus structural reforms, negative income taxes, etc. will amount to incremental, rock-soup socialism? (That's what critics will say anyway.) Or is that a chance we'll have to take, rock-soup socialism being a lesser evil than overshoot and crash?*

HD: Critics want to privatize benefits, but are only too happy to socialize costs. I want to privatize costs as well as benefits, so I claim to be less socialistic than the critic. Also corporations are islands of central planning in a sea of market relations. As the islands merge and get big, the sea of market relations dries up and more of economic life is regulated by the within-firm principle of central planning rather than the between-firm principle of markets. Only central planners could have robbed Enron so badly.

JA: *Is there a danger that the lateness of the hour, our continued nonresponse to the problem of unsustainability, our obstinacy in growth, greed and gluttony, will be seized on as a pretext for a micro-managing socialism? Some politician could say, "It's too late for tradeable permits and taxing bads, this is no time for half-measures, we've got to put the screws to throughput with nationalization and all sorts of rationing and controls"?*

HD: An unhappy, but possible, outcome if we can't teach politicians some economic principles.

JA: *So if we want to preserve as much of the blessings of liberty as possible, we've got to act sooner rather than later?*

HD: Yes. I think the general point here is that crisis is the enemy of civil liberties. If we want to keep civil liberties we had better avoid those crises that cannot tolerate the error, and even malevolence, that inevitably come with freedom.

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JA: *So much seems to depend on our ability to see what we look at and our will to act on what we see! Right now we seem to be sorely lacking in both. Do you think that will change any time soon?*

HD: I am not optimistic, but one must be hopeful.

III. Immigration

JA: *You've endorsed immigration reform as a means to stabilize America's population. Specifically,* For the Common Good *called for ending illegal immigration and regaining control of our borders. It also called for maintaining legal immigration at roughly 600,000 a year. Have you given any more thought to immigration since?*

HD: Yes, but have come up with no better proposal. However, see "Globalization and Its Inconsistencies."

JA: *Doesn't mass immigration to the developed world make shifting to an SSE harder? We've got droves of people coming here in search of affluence, going from low per-capita throughput countries to a much higher per-capita throughput country. Not only is their presence an added burden on our ecosystem, won't they exert powerful political pressure for more affluence, more growth?*

HD: Yes, see article.

JA: *Given that, would you keep legal immigration at 600,000, or does that figure now seem too high?*

HD: For a start it seems reasonable, given politics.

IV. Daly's Own Projects, Politics

JA: *What are you working on now?*

HD: A textbook in Ecological Economics.

JA: *Unfortunately,* Steady-State Economics *is out of print. Any prospect of bringing it back? Or perhaps of new, updated editions of* Steady-State Economics *and* For the Common Good?

HD: Don't know. The latter has a 1994 edition. Years pass too quickly!

JA: *Are you active at all politically?*

HD: I publicly supported Nader in the last election, but am not what you would call an activist in campaigning.

JA: *Are either of the major parties aware of the unsustainability problem? Both seem firmly committed to growth and globalization. Is anybody in either party receptive to your message?*

HD: No. At least not yet!

JA: *How much progress has there been in politics and public policy toward a saner course of action?*

HD: Some, but disappointingly little officially. Some NGOs are doing great work.

JA: *In* For the Common Good *you locate yourself on the Left due to your commitments to social justice, restoration of community and local control, and so on. Yet much of what you say would be agreeable to conservatives of the line of Edmund Burke, the Southern Agrarians, Richard Weaver, and Russell Kirk. Burke maintained that prudence is the highest quality in politics, and moving to a steady-state economy is the prudent course if anything is. The Agrarians staunchly defended small family farms and business, and broad distribution of ownership of productive property. So did Weaver, whose* Ideas Have Consequences *(1948) deplored economic centralization, consumerism, and the dogma of economic man, and shared Joseph Schumpeter's concern about the evaporation of property. The economist Wilhelm Roepke had similar views and decried exploding population. Russell Kirk knew Weaver and Roepke and shared their positions, was aghast at the loss of community, called the automobile a "mechanical Jacobin," and declared that "There is nothing more conservative than conservation." Are you familiar with this strain of conservatism? If so, how has it influenced your thought?*

HD: Somewhat, and becoming more familiar. Lots of smart and decent people in different intellectual traditions.

JA: *Could a coalition of a traditionalist, anti-globalist, decentralist, localist Right and a localist, populist, environmentalist Left possibly be a useful vehicle for blocking the destructive trends you deplore and exerting pressure to get us onto a saner path?*

HD: A worthy hope!

JA: *How likely is that, given the formidable obstacles to creating viable third parties in America?*

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HD: Not likely, but we are operating in the realm of hope rather than optimism.

JA: *Not to get too far afield, but given the death grip which gluttony, growthmania and globalization apparently have on the "demopublicans," are reforms to open up our political process, so greener perspectives can gain a voice and some clout, a precondition for creating a steady-state economy?*

HD: Yes.

V. Economics

JA: *Our unsustainable economic system is in a compelling sense the house that economics built. What's your assessment of academic economics today?*

HD: A very large waste of time and resources, once we get beyond the most basic courses.

JA: *You've rightly lambasted economics for the "fallacy of misplaced concreteness" — abstracting from reality, treating abstractions as if they are real, neglecting the aspects of reality which models omit. Also, economics has been mathematicized into unintelligibility, often to make trivial or obvious points. Yet despite persistent criticism, abstraction and hyper-math still dominate. How can so many bright people not know that so much of what they do is dysfunctional and a horrid waste of time?*

HD: I don't know — it looks like sleepwalking, or follow the leader blindly.

JA: *Do these things persist because that's what academe's reward system — tenure, promotions, prestige, grants, etc. — encourages?*

HD: Yes, but that just pushes the question one step back. The rules of the game are as you indicate, but why continue to play a stupid game? Especially if one already has tenure?

JA: *Is there a psychological appeal as well? I've wondered if economists want to acquire the prestige of genuine sciences like physics by emulation, and that model building is driven by* libido dominandi *— a desire to replace a messy, complex reality which one can't control and manipulate with a reductive, substitute reality called a model which one can, which one can create out of thin air like a god, disregarding reality's limits (Gary Becker's notorious assumption of human asexual reproduction for example), and then manipulate at will?*

HD: Yes, some call it "physics envy."

JA: *If this dangerous abstraction from reality endures because it has powerful psychological roots, what does this imply for the prospects of adopting an economics disciplined to the facts, such as resource finitude and entropy? Working out one's ideas within the confines of such reality constraints seems to require more humility than most academics have.*

HD: Yes, humility is in shorter supply than IQ.

JA: *Eventually, or so we're told, the truth will win out in academe's "marketplace of ideas." Yet it happens with glacial slowness if at all. Mavericks who tell awkward truths (e.g., Georgescu-Roegen) get marginalized. Also, there's no penalty for being wrong. Prominent economists can assert that "the world can, in effect, get along without natural resources" (Robert Solow) or make nonsensical assumptions (Becker), yet their prestige endures. Why does the "marketplace of ideas" have so little market discipline?*

HD: Prestigious big shots have the power to ignore critics. Also they have no interest in dealing with critics, because if they win they get no credit because they are expected to win. If they lose, then they lose big — a big upset. The easiest course is to ignore criticism.

JA: *Are there any signs of improvement? Or are the reward system and psychological factors too powerful, reinforcing all the wrong things?*

HD: Ecological economics is an improvement, and there are other dissidents within and around economics.

JA: *Repeatedly in economics we see paradigms changing only in response to external phenomena that can't be ignored. It took the Great Depression to make the Keynesian revolution possible; it took the horrors of the Soviet bloc to discredit Marxism. Will it take another external calamity — an environmental crisis, a painful collision with the limits to growth — to topple the growth/globalization consensus in favor of steady-state economics?*

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HD: I think this is a likely scenario. Probably the reason for worrying about steady-state and ecological economics is not that it will avoid the crash, but that after the crash we will not have to start from scratch — there will be some good ideas on the table already.

JA: *Sounds like you regard a crash as inevitable, or overdetermined. Correct?*

HD: No, not inevitable, but certainly possible and even likely. I am not optimistic about avoiding a crash, but I am hopeful.

JA: *If the crash is baked in the cake, is the goal of steady-state economics really to salvage as much as possible of a humane, sustainable civilization after the wreck?*

HD: After the wreck the task would be to rebuild. If we have some ideas about how a steady-state economy could work, we might then have the will to try it, to do something different rather than just start another boom and bust cycle with whatever is left. This is hope versus optimism again. Optimism says we can, through human intelligence, avoid the crash. Hope says maybe, but perhaps not. Yet, even if not, we can try to rebuild something better out of the ruins.

JA: *Is there a generation of ecologically aware economists coming up? Can you name any younger economists you deem especially promising?*

HD: Yes, there are some. I will refrain from naming them.

JA: *What advice do you give to students who aspire to become economists?*

HD: Learn economics as it is taught, but keep your independent critical attitude, and be prepared for resistance.

JA: *Besides your own works, what literature would you especially recommend, both to young economists and to laymen?*

HD: The journal, *Ecological Economics*.

JA: *You've said elsewhere that C. S. Lewis's* The Abolition of Man, *Rachel Carson's* Silent Spring, *and Georgescu-Roegen's* The Entropy Law and the Economic Process *were crucial in forming your thinking. What other books were important to you?*

HD: The writings of Kenneth Boulding, and Frederick Soddy.

JA: *Who in your view are the truly great economists?*

HD: Smith, Ricardo, Malthus, Mill, Sismondi, Keynes, Irving Fisher, Boulding, Georgescu-Roegen.

JA: *What is your view of Malthus?*

HD: Enormously important and influential, not only in his own right, but through his influence on Darwin, Marx, and Keynes.

JA: *Given our predicament and your view of our likely prospect, will Malthus have the last word?*

HD: Malthus spoke of both "preventive" and "positive" checks on population. I think he has the last word, in the sense that if we don't adopt preventive checks then we will experience the positive checks (famine, war, plague). We should extend Malthus' logic to populations of things as well as people — cars, houses, refrigerators. All these things, like human bodies, are what the physicists call "dissipative structures." Their default tendency is to fall apart. Their construction and maintenance requires an entropic throughput from the environment — in other words, a load on environmental carrying capacity.

JA: *How strong is the Simon flat-earth school in economics and the environmental debate today?*

HD: Simon's latest reincarnation, Bjorn Lomborg, was recently censured by the Danish Science Council for playing fast and loose with the facts. That is encouraging. But like Simon he is filling a demand for "optimism." Optimism is cheap hope or "hope lite" and most people need it because the spiritual demands of hope are too heavy.

JA: *Have you read Lomborg's book?*

HD: No, I have not. I did my part in reading carefully and reviewing Julian Simon's works. I am too old to waste time dealing with this junk any more. Not to imply that others should not — I hope they do.

JA: *It's telling that flat-earthers traffic in caricatures (Malthus is falsified routinely) and focus on easily-ridiculed extreme specimens such as the Earth First! eco-terrorists and the Deep Ecologists. Serious thinkers are often simply ignored — both Simon and Lomborg ignored Hubbert in their discussions of oil.*

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Have any of them attempted to seriously, thoughtfully engage your work?

HD: I think it is safe to say that there has been no serious review or critique of my work by standard economists, just a few fleeting skirmishes. I have, however, received considerable attention from noneconomists, including academics of various stripes, and have even received some international prizes. So I cannot complain too much. In some quarters I do get a hearing.

JA: *Some pro-free market Christians such as Doug Bandow, Father Robert Sirico, and E. Calvin Beisner attack environmentalists and are devotees of Simon. They've published books full of Simonesque rah-rah: it's getting better and better; no environmental problems, it's all scaremongering; there's no such thing as overpopulation; carrying capacity is inoperative since nobody can say just what it is; fossil-fuel based fertilizers are raising crop yields; global warming is good: air with higher CO_2 concentration accelerates plant growth! One (Beisner,* Where Garden Meets Wilderness, *pp. 25-26) even argued that Christians are mistaken in seeing the universe as a closed system and the Second Law as always operating. They never even try to deal with your works. Are you aware of this school of thought? How would you answer them?*

HD: I have heard of them, but they are both scientifically and theologically below my cut-off point. Too much good stuff to read that I can't justify spending time on these folks. I am sure some ignore me by the same logic. So be it. But only one of us is wrong. I trust others will deal with them.

JA: *What do you suppose is the attraction of Simon, who was not religious, for such Christians? Traditionally, Christianity taught that this is a fallen world, and that our true reward and goal is union with God in Heaven. When did this secular Panglossian minstrel of economism become pro-market Christian scribblers' favorite economist?*

HD: Unfortunately many brothers and sisters in Christ are also ignoramuses and proud of it. I hope others have the patience and long suffering charity to engage them. As indicated previously my patience is thin right now. That is a spiritual defect, but I need to recognize it!

VI. Religion and our Prospect

JA: *One theme that emerges in your work is that our crisis is ultimately religious: man is in a sinful relationship with God, Creation, his neighbor, even himself — and that the ultimate solution is spiritual, too: manifesting love of God by giving Creation and community their due. There's a spiritual hunger now. Is the climate of opinion getting better regarding community and stewardship?*

HD: I think so.

JA: For the Common Good *mentions the Amish as a counterexample to corporate farming and economic man: people who use low-impact farm technology, practice outstanding soil husbandry, have strong communities, and actually turn in a better economic performance than many industrial farms. But they are also a people whose religion dominates and prescribes their way of life, and generates a complete system of social control, even to which machines and modes of transport they are allowed to use. Most Americans seem to want an undemanding, nonjudgmental "Christianity lite" that's miles away from the Amish faith. It certainly doesn't prescribe much in the way of technology and standard of living, and its concern for community doesn't seem to go beyond endorsement of the welfare state, and sporadic community service. As a Christian, I'm all for a more religious way of life, but is "Christianity lite" really up to the job of helping orient us to a saner, sustainable way of life?*

HD: No, "Christianity lite" is no substitute for "economics lite."

JA: *More to the point, could it keep us on a more ecologically modest path once the material forfeits start to bite and people get nostalgic for the good old days of affluence and are tempted to backslide?*

HD: No, the need is for grace and divine help — the source of hope.

JA: *This spiritual crisis at the bottom of our predicament — do you see this as a new phenomenon in history, a child of post-Enlightenment secularization, or a more virulent manifestation of an intrinsic flaw in our nature that's been there all along? From the Garden of Eden on, history is full of examples of people who could not rest content within the limits of creaturehood, who couldn't leave well*

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enough alone, be content with what they had, or stop when they'd had enough. There's a tendency in man to rebel, to try to be his own god. Irving Babbitt defined man as "the infinite animal" and Weaver argued that man is "impious." Roger Shattuck wrote a wonderful book titled Forbidden Knowledge. *He argued that there's a fatal curiosity for the forbidden in human nature that leads us to go where we shouldn't — into Faustian science such as genetic engineering, for example. I think Babbitt, Weaver and Shattuck were right and that modernity's decisive contribution has been to make impiety of all kinds intellectually respectable and convince man that impiety is the royal road to happiness. What do you make of it all?*

HD: The above is convincing, even if the Enlightenment was an acceleration of impiety and quest for forbidden knowledge. I find C. S. Lewis helpful on this. He gives science its due without following it into impiety.

JA: *Also, there's an obstinacy in sin. Humanity has a bad record of disregarding voices of wisdom who tell us what we don't want to hear, and it takes very hard knocks on the head to get us to shape up. The attentive, repentant Ninevites are the exception, not the rule. There seems to be a lot of blindness about how we live and what we're doing to our ecosystem. Is there enough wisdom, enough of a desire to live, to pull us back from the brink? How do you see it all coming out?*

HD: See below. (Article on page 198)

JA: *If there's self-will, restlessness and impiety at the core of our souls, could a steady-state economy hold up over the long run? Do we have the self-control and wisdom to live within limits (in Garrett Hardin's phrase), or would we eventually slip the leash of the SSE and get gluttony and impiety going again?*

HD: See below.

JA: *Or is there a silver lining in our predicament? Will we finally shape up because we have no other choice — because our choice is piety or oblivion, and we'll have to live within limits if we're going to live at all? So ultimately, in the extreme long run, is the human prospect hopeful?*

HD: See below.

JA: *You've been wrestling with all this for thirty years. You must have had some bleak moments pondering our situation. How do you keep up your morale?*

HD: Closer to forty years now. As you will have inferred from previous comments I think morale is a function of hope, not optimism. Optimism is cheap, usually ill-founded, and often disappointed. It leads to despair and burn-out. But hope is not easy — it requires faith and spiritual grounding. Since modernity does not value faith, it generates little hope, and all the more tries to find a substitute in optimism.

JA: *Could you elaborate a bit on the distinction between optimism and hope?*

HD: It is basically a religious distinction. If one believes that we are merely the product of random mutation and natural selection (the selective criterion being fitness to a randomly changing environment, where "fitness" means reproductive success) — that reality, including one's self, is not creation but accident; that what we used to call Creation is really "Randomdom" — then one may attain optimism in the gambler's sense, but not hope. There is in Randomdom no providence or power in which to hope. Hope arises from religious experience, for example that of the psalmist:

> *For thou didst form me in my inward parts, thou didst knit me together in my mother's womb, I praise thee for thou art fearful and wonderful. Wonderful are thy works! Thou knowest me right well; my frame was not hidden from thee, when I was being made in secret, intricately wrought in the depths of the earth.* (Psalm 137:13-15)

The damage done by Darwinism was not to show us that we are related to other species — that is all to the good. The damage comes from the odd doctrine that random, purposeless processes "explain" everything about our origin and our being. The psalmist's cry says, "I know that I am not an accident, I hope in God who made both me and you and all Creation." We pay too much attention to the Darwinists, not enough to the psalmists.

JA: *We've covered a lot of ground here. It's been a great experience. Thank you for your time.*

HD: A pleasure. Thanks for your penetrating questions. ■

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Steady-State Economics

Concepts, Questions, Policies

by Herman E. Daly

This lecture first discusses the pre-analytic vision of steady-state economics, along with its basic magnitudes, idea of efficiency, and relations to the traditional concepts of income and capital. Next it addresses some analytical questions suggested by the steady-state vision. Finally, it discusses some policy issues of moving toward a steady-state economy.

The Pre-Analytic Vision and Basic Concepts of Steady-State Economics

The pre-analytic vision from which steady-state economics emerges is that the economy, in its physical dimensions, is an open subsystem of a finite, non-growing and materially closed total system — the earth-ecosystem or biosphere. An "open" system is one with a "digestive tract," i.e., that takes matter and energy from the environment in low-entropy form (raw materials), and returns it to the environment in high-entropy form (waste). A "closed" system is one in which only energy flows through, while matter circulates within the system. Whatever flows through a system, entering as input and exiting as output, is called "throughput." Just as an organism maintains its physical structure by a metabolic flow and is connected to the environment at both ends of its digestive tract, so too an economy requires a throughput, which must to some degree both deplete and pollute the environment. A steady-state economy is one whose throughput remains constant at a level that neither depletes the environment beyond its regenerative capacity, nor pollutes it beyond its absorptive capacity.

Growth of the subsystem is further limited by the complementary relation between manmade and natural capital.[2] If the two forms of capital were good substitutes, then natural capital could be totally replaced by manmade, and the only limit to expansion of manmade capital would be finitude of the containing system. But in fact manmade capital loses its value without a complement of natural capital. What good are fishing boats without populations of fish? Saw mills without forests? And even if we could convert the whole ocean into a catfish pond we would still need the natural capital of solar energy, photosynthetic organisms, nutrient recyclers, etc.

The pre-analytic vision underlying standard economics is that the economy is an isolated system: a circular flow of exchange value between firms and households. This vision is useless for studying the relation of the economy to the environment. It is as if a biologist's vision of an animal contained only a circulatory system, but no digestive tract.

As long as the scale of the economy was very small relative to the ecosystem, one could abstract from the throughput since no apparent sacrifice was involved in increasing it. The economy has now grown to a scale such that this is no longer reasonable. We have also failed to make the elementary distinction between growth (physical increase in size resulting from accretion or assimilation of materials), and development (realization of potentialities, evolution to a fuller, better, or different state). Quantitative and qualitative changes follow different laws. Conflating the two, as we currently do in our measure of economic activity, GNP, has led to much confusion.

The pre-analytic vision which supports most economic analysis is that the economy is the total system and is unconstrained in its

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growth by anything. Nature may be finite, but it is just a sector of the economy, for which other sectors can substitute, without limiting overall growth in any important way. If the economy is seen as an isolated system then there is no environment to constrain its continual growth. But if we see it as a subsystem of a larger, but finite and non-growing ecosystem, then obviously its growth is limited. The economy may develop qualitatively without growing quantitatively, just as the planet Earth does, but it cannot continue to grow — i.e., beyond some point it must approximate a steady state in its physical dimensions. Sustainable development is development without growth — a physically steady-state economy that may develop greater capacity to satisfy human wants by increasing the efficiency of resource use, but not by increasing the resource throughput.

In addition to throughput there are two other magnitudes that are basic: stock and service. Stock is the capital accumulation, manmade and natural, as well as durable consumer goods, that yields a flow of services. Services are satisfactions of wants yielded by the stock. The throughput is the entropic or metabolic physical flow that maintains the stock. Stock is an intermediate magnitude that on the one hand yields services, and on the other requires throughput for its maintenance and replacement. Service is benefit; throughput is related to cost. For any given level of stock, throughput should be minimized and service maximized. In an empty world increasing throughput implies no sacrifice of ecosystem services, but in a full world it does. The ultimate cost is the sacrifice of ecosystem services required by using the natural capital stock as a source of throughput rather than as a source of direct ecosystem services. Throughput begins with depletion and ends with pollution, both of which are costs in a full world. Therefore it makes sense to minimize throughput for any given level of stock. If we recognize that the economy grows by converting ever more of the ecosystem (natural capital) into economy (manmade capital), then we see that the benefit of that expansion is the extra services from manmade capital and the cost is the loss of service from reduced natural capital.

The efficiency with which we use the world to satisfy our wants depends on the amount of service we get per unit of manmade capital, and the amount of service we sacrifice per unit of natural capital lost as a result of its conversion into manmade capital. This *overall ecological-economic efficiency is the ratio:*

$$\frac{\text{MMK services gained}}{\text{NK services sacrificed}}$$

where MMK is man made capital and NK is natural capital. In an empty world there is no noticeable sacrifice of NK services required by increases in MMK, so the denominator is irrelevant. In a full world any increase in MMK comes at a noticeable reduction in NK and its services.

This efficiency ratio can be "unfolded" into four components by means of the identity below.[3] Each term represents a dimension of efficiency that might be improved by increased investment in knowledge or technique.

Ratio (1) is the **service efficiency** of the manmade capital stock. It depends on several things. First, the technical design efficiency of the product itself. Second, the economic efficiency of resource allocation among the different product uses in conformity with individual preferences and ability to pay. Third, the distributive efficiency among individuals. The first two are straightforward and in conformity with standard economics, but the third requires explanation. Usually distribution is separated from efficiency by the Pareto condition that utility cannot be compared across individuals, and it does make sense to believe that total social utility increases when resources are redistributed from the low marginal utility uses of the rich to the high marginal uses of the poor. One can reject the total egalitarianism implicit in carrying this idea to its logical extreme while agreeing with Joan Robinson that it is possible to allow too much of the good juice of utility to evaporate from commodities by allowing them to be unequally distributed. In a full world investments in distributive efficiency can no longer be ruled out of bounds. Economists have

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$$\frac{\text{MMK services gained}}{\text{NK services sacrificed}} = \underbrace{\frac{\text{MMK services gained}}{\text{MMK stock}}}_{(1)} \times \underbrace{\frac{\text{MMK stock}}{\text{throughput}}}_{(2)} \times \underbrace{\frac{\text{throughput}}{\text{NK stock}}}_{(3)} \times \underbrace{\frac{\text{NK stock}}{\text{NK services sacrificed}}}_{(4)}$$

studied allocative efficiency via the price mechanism, in great detail. Further refinements from deeper study of this dimension of ratio (1) will probably be less productive than the study of technical and distributive dimensions, or of the other three efficiency ratios.

Ratio (2) reflects the **maintenance efficiency** or durability of the manmade capital stock. While ratio (1) measures the service intensity per unit of time of the manmade stock, ratio (2) measures the number of units of time over which the stock yields that service. Ratio (2) is the durability of the stock, or the "residence time" of a unit of resource throughput as a part of the manmade capital stock. A slower rate of throughput, *ceteris paribus* ["other things being equal"], means reduced depletion and pollution. Maintenance efficiency is increased by designing commodities to be durable, repairable, and recyclable. Or by designing patterns of living that make certain commodities less necessary to begin with. Eliminating planned obsolescence and excessive model changes would improve this ratio. As Kenneth Boulding has long argued, we must learn to focus on the service of the capital stock as the benefit, and treat the flow of new production as a cost made necessary by the regrettable tendency of the stock to become worn out or used up. A longer life expectancy for the stock means less production is needed, which in turn reduces the throughput which reduces depletion and pollution.

Ratio (3) is the **growth efficiency** of natural capital in yielding an increment available for offtake as throughput. It is determined by the biological growth rate of the population or ecosystem being exploited. For example, pine trees grow faster than mahogany, so in uses where either will do, pine is more efficient. Generally nature presents a menu of different species growing at different rates. If we are able to design our technologies and consumption patterns to depend on the faster growing species, that will be more efficient, *ceteris paribus*.

With the advent of genetic engineering there will be more attempts to speed up growth rates of exploited species (e.g., bovine growth hormone). The green revolution involves an attempt to speed up growth rates of wheat and rice. Since an increase in biological growth rate frequently comes at the expense of stability, resilience, resistance to disease or predators, it may be that attempts to speed up reproductive rates will often end up costing more than they are worth. It is for now surely better for humans to slow down our own biological growth rate than to attempt to speed up the growth rates of all the species we depend upon. Nevertheless, we can to some degree adapt our pattern of consumption to depend more on naturally faster growing species, where possible.

For sustained-yield exploitation ratio (3) will vary with the size of the population maintained, according to the familiar inverted-U-shaped function. For any chosen combination of population size and yield ratio (3) would remain constant over time under sustained yield management. Maximum sustained yield would of course maximize this dimension of efficiency over the long run (if harvesting costs are constant). In the short run this ratio can be driven very high by the non-sustainable practice of exceeding renewable rates of harvest and thereby converting permanent stock into one-time throughput. This appears as an increase in growth efficiency due to our absurd accounting practice of counting natural capital depletion as current income.[4]

Ratio (4) measures the amount

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of natural capital stock that can be exploited for throughput (either as source or sink), per unit of other natural services sacrificed. For example, if we exploit a forest to get maximum sustainable yield of timber (or maximum absorption of CO^2), then we will to some degree sacrifice other natural services of the forest such as wildlife habitat, erosion control, and water catchment. We want to minimize the loss of other ecosystem services per unit of natural capital managed with the objective of yielding a single service — usually that of generating raw material throughput. Ratio (4) might be called ecosystem service efficiency reflecting the minimization of loss of other ecosystem services when a population or ecosystem is exploited primarily for throughput extraction or absorption.[5]

The world is complicated and no simple identity can capture everything. However, these four dimensions of ecological-economic efficiency may be helpful in devising ways to invest indirectly in natural capital. As NK is converted into MMK we want at each step to maximize the service from the increment of MMK and to minimize the loss of ecosystem service from the decrement of NK. But at some point, even if carried out efficiently, this process of conversion of NK into MMK will itself reach an economic limit, an optimal scale of the economic subsystem beyond which further expansion would increase ecological costs faster than production benefits. This optimal scale is defined by the usual economic criterion of equating marginal costs and benefits. This criterion assumes that marginal benefits decline and that marginal costs increase, both in a continuous fashion. It is reasonable to think that marginal benefits decline because humans are sufficiently rational to satisfy their most pressing wants first. But the assumption that marginal costs (sacrificed ecosystem services) increase in a continuous fashion is problematic. As the human niche has expanded the stresses on the ecosystem have increased, but there has been no rational ordering by human or providential intelligence to ensure that the least important ecosystem services are always sacrificed first. We appear to be sacrificing some vital services rather early. This is another way of saying that ratio (4), ecological service efficiency, has been ignored. If we begin to pay attention to that dimension of efficiency then we may expect human rationality to begin to order the sacrifice of ecosystem services from least to most damaging, and thus justify the economists' usual assumption of gradually rising marginal costs. That would make the optimal scale of the human niche more definable.

The present lack of rational sequencing of ecosystem costs is due both to nonrecognition of the problem and to ignorance of ecosystem functioning. Prudence in the face of large uncertainties about ecosystem costs should lead us to be very conservative about risking any further expansion. But even with complete certainty and a least-cost sequence of environmental costs, there would still be an optimal scale beyond it would be anti-economic to grow.

Even within the confines of more traditional concepts a similar conclusion can be reached. Exceeding carrying capacity in either source or sink functions leads to a loss of that function in the future. This loss represents depreciation of natural capital, which, like depreciation of manmade capital, is a reduction in productive capacity, and must be deducted as a cost from gross income to arrive at net income. Renewable natural capital is thus treated as a productive machine whose maintenance costs must be covered by the process of production. Of course, some natural capital is nonrenewable and its depletion is best considered as disinvestment of already "produced" inventories, rather than as a reduction of future capacity to produce. Consequently the depletion of nonrenewable inventories (resource reserves) should not even be counted in gross income, much less in net income. But since it usually is mistakenly included in gross income we must at least subtract it in moving to net income, as we do with depreciation of renewable natural capital. In Balance of Payment Accounts it is worth noting that this reclassification of receipts from exploitation and export of nonrenewables from current account to capital account will convert many balance of trade surpluses into deficits.

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Maintaining capital intact is fundamental to the very definition of income. This requirement should be applied to natural capital as well as to man made. Steady- state economics does this in physical terms by maintaining critical natural capital intact (rejecting the substitution of manmade for natural capital beyond some point). The scale of the economic subsystem cannot grow beyond the size that can be supported by a renewable throughput, or "natural income" that is yielded continuously by natural capital that is maintained intact. Logically this would preclude any use of nonrenewable resources, since, by definition, they cannot be maintained intact in any physical sense. Yet to leave such wealth in the ground never to benefit anyone is absurd. Consequently, steady-state economics advocates their exploitation, but subject to the following rule of "quasi-sustainability" – deplete nonrenewables at a rate equal to the rate at which a renewable substitute is developed (and of course at a rate that is within sink constraints as well). This would involve investing a portion of the rents from nonrenewable resource extraction in the development of the renewable substitute.

III Analytical First Steps: Three Questions Raised by the Steady-State Paradigm

If we accept the pre-analytic vision of the economy as subsystem of a finite and nongrowing total system, then the first three questions for analysis that spring to mind are:

(1) How big is the economy relative to the ecosystem?

(2) How big can it become before its maintenance demands volumes of throughput that overwhelm and destroy the regenerative and assimilative capacities of the environment?

(3) How big should economy be – i.e., what is the scale of the economic subsystem that optimizes value, either for humans alone, or for the biosphere as a whole?

These questions have not, and indeed could not, occur within a discipline founded on the paradigm of the economy as an isolated system – the circular flow.

Before attempting to answer these questions, it is worth pausing to ask why standard economists are so reluctant to adopt the open subsystem vision? After all, it is obviously more congruent with physical reality and more relevant to the new pattern of scarcity induced by growth itself – i.e., the shift from an "empty world" to a "full world." A large part of the answer has been given by Thomas Kuhn, who explains the reason for our extreme reluctance to admit the obvious fact of limits to growth. Growth has been our answer to poverty. If we cannot continue to grow, and we still want to eliminate poverty, then we must face up to sharing and to population control. There is a third alternative: increasing throughput productivity, which, as has already been emphasized, is development rather than growth. That development without growth, however desirable, would be sufficient to overcome poverty at today's level, with no help from increased sharing and population control, stretches the faith of even the most devout technical optimist. Pretending that growth can continue thus serves to keep politically difficult issues at bay, or at least out of sight.

Returning to the three questions:

How big *is* the human subsystem relative to the total ecosystem? Probably the best single index of relative size is the percentage appropriation by human beings of the net primary product of photosynthesis. This is on the order of 25% for the globe as a whole, and 40% for the land-based ecosystems.[6] These figures reflect both direct appropriation, as in food and fibre used by humans, and indirect appropriation by reducing the photosynthetic capacity of an ecosystem as a result of human interventions, such as desertification, paving over, etc.

How big can the human economy be relative to the total ecosystem? Taking the lower figure of 25% it is clear that two more doublings will give 100%. So we can take a factor of four as an outside limit to the scale increase of the human economy. The current doubling time is about 40 years, so the outside limit would be encountered in roughly one average lifetime. It is very much an outside limit because it is doubtful that humans

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are capable of managing the entire biosphere in a way that would permit survival. Indeed there is plenty of evidence that the present scale is already unsustainable in the long run. These calculations are in sharp contradiction with the Brundtland Report's vision of sustainable development as requiring an expansion of the world economy by a factor of five to ten. Thus Brundtland says a greater than five-fold expansion is necessary, our calculation shows that less than four-fold is possible.

How big should the economy be relative to the ecosystem? What is its optimal scale? This is the big question for steady-state or ecological economics. One definition of optimal scale is purely anthropocentric: grow until the marginal benefits to humans of further growth just equal the marginal costs. Other species are valued only instrumentally according to their capacity to satisfy human wants. Assuming that wants bear some relation to needs, this would be a great advance over current practice that hardly recognizes even instrumental value of nonhuman species. The other concept of optimum would be biocentric, attributing intrinsic as well as instrumental value to other species, by virtue of their being sentient creatures capable of enjoying their own lives. The biocentric optimum size of the human niche would be smaller than the anthropocentric optimum. The one characteristic that either optimum must have, in the judgment of most people, is that it be sustainable. There are many sustainable scales, only one of which is optimal. But for now just achieving sustainability is a sufficient challenge, in that it will require a reduction in the human scale unprecedented in modern times. Since scale is the product of population times per capita resource use, it would appear that both of these factors need to be reduced.

To avoid possible confusion it should be emphasized that the scale issue under discussion refers to macroeconomics – the scale of the aggregate economy relative to the ecosystem. In microeconomics the issue of optimal scale is omnipresent – indeed microeconomics is about little else than defining the optimal scale or level of an activity, be it production or consumption, by some variant of the MB=MC rule [marginal benefit equals marginal cost]. All the more strange that the most fundamental concept of microeconomics should be totally absent from macroeconomics!!

IV Policy First Steps: Moving to A Steady-State Economy

It is important to distinguish three independent optima or policy goals that require three independent policy instruments for their attainment. These are: optimal allocation (the goal of efficiency served by the instrument of relative prices); optimal distribution (the goal of fairness served by the instruments of income and wealth redistribution); and optimal scale (the goal of sustainability served by a currently non- existent policy instrument of throughput control – i.e., a policy that limits population and/or per capita resource use). The distinction between allocation and distribution is a basic and well-accepted part of standard economics. No one argues that the costs of injustice should be internalized into prices as a part of the efficiency problem. Justice is one thing, efficiency is another, and economists take great pains to keep them separate. Yet many seem to think that the cost of excessive scale can and should be internalized into prices and that there is no fundamental distinction between optimal allocation and optimal scale. This is a confusion. Scale is the product of population times per capita resource use. Population can double or be cut in half and the market will still optimally allocate resources among their alternative uses and attain a "Pareto optimum" [i.e., a situation in which no one can be made better off without making someone else worse off]. Resource consumption per capita could double as a result of fortuitous discoveries, or plummet as a result of natural disaster or simple depletion, and in all cases the market would attain an optimal allocation of whatever resources were available. A changed scale will lead to a changed set of prices (different Pareto optimum), just as a changed distribution leads to a changed set of prices (different Pareto optimum). Relative price adjustments effect the best

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possible adaptation to whatever circumstances of distribution and scale are given. Prices help us to make the best of a given situation, but that "given" situation may be becoming ever more unjust or unsustainable over time.

To clarify the distinction, suppose a situation in which the scale of the economy was so small that the efficient prices for water and air were zero. Population doubles and so does per capita resource use so that the total throughput has increased by a factor of four. It now turns out that the efficient prices for air and water are no longer zero, but some positive numbers, perhaps large. But large or small they are the efficient prices and we are at a Pareto optimum. In both cases prices are right. Does it not still make sense for someone to ask: are we better off or worse off now that we have to pay for air and water, compared to back when they were free goods? Do the benefits of the larger scale outweigh the costs? Might we not have increased costs more than benefits in growing to this larger scale? That is a perfectly obvious and sensible question, and economists cannot answer it.

The central policy issue is to limit scale – preferably at the optimal level, of course, but for a start any sustainable level will do. Since the present scale is beyond all sustainable levels we must reduce scale, and to begin reducing scale we must first stop it from growing larger.

The impact on the environment comes from the scale of throughput that can be decomposed into three factors:

$$T=P \times Y/P \times T/Y$$

where T = throughput; P = population; and Y = national income. In other words, environmental impact (T), equals population (P), times affluence (Y/P or per capita income), times technology (T/Y, or throughput intensity of income).

Since an x% change in any of the three factors will give an x% change in the product, it follows that in an arithmetic sense all three factors are of equal importance. Nevertheless, it makes sense to ask in any concrete situation which factor is most likely to permit an x% change. As a very broad generalization one could say that the South has the most room for an improvement in P (reducing population growth rates); the North has the most room for improvement in Y/P (reducing per capita consumption); and the formerly communist East has the most room for an improvement in T/Y (reducing the throughput intensity of technology). But again, all countries need to pay attention to all three factors.

Nevertheless, many economists tell us that technology will solve the problem, with no need to reduce population or affluence. For the world as a whole, some orders of magnitude are instructive in indicating just how much faith in technology is required to accept this proposition. P is projected to double in roughly the next 40 years. Per capita GNP in the high-income countries is on the order of 23 times higher than for the low- and middle- income countries (i.e., 23 = $18,330/$800, from Table A.2, *World Development Report* 1991). If the goal is for the poor to catch up with the rich, and there is no further increase in the average per capita income of the rich countries over the next 40 years, then to avoid greater impact on the environment than today, technology would have to improve by a factor of about 2 x 23 = 46. Is it feasible to increase the efficiency of our total use of the environment by 46 times? The Brundtland Report called for increasing the size of the economy by a factor of five to ten. They did not say how much of that they hoped to get from an improvement in technology (development), and how much would come from throughput increase (growth). Suppose unrealistically that the full factor of ten increase could come entirely from efficiency improvement. That would still leave a factor of 4.6 to be made up by a decrease in population or affluence, just to keep throughput constant at the present already unsustainable level. Alternatively, we could experience a 4.6- fold increase in throughput with population and affluence remaining the same. And this whole calculation assumes that the rich countries do not increase their per capita income beyond the 1989 figure of $18,330 during the 40 years that it takes for population to double. So far the rich have shown no willingness to stand still while the poor catch up. And the standard doctrine is that

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the rich should grow more, to provide markets for the poor.

It may be that a factor of 23 difference between the rich and the poor-plus-middle is an overstatement in view of the fact that poorer countries have a relatively large nonmonetized sector compared to the rich. Also, since there is a sectoral shift away from resource-intensive activities beyond some point as economic expansion continues, a 23-fold increase in GNP would entail a less than 23-fold increase in throughput. But even reducing the rich/poor ratio from 23 to 10 in the light of these considerations still leaves us with a factor of 2 x 10 = 20 increase in resource productivity required to keep throughput constant.

How likely is such an increase? Keep in mind that the large increases in "productivity" experienced historically have been in capital, land or labor productivity – not in resource productivity. In fact one reason for the historical increase in labor, capital and land productivities has been the large increase in resource throughput. In agriculture, for example, the productivity of capital, labor, and an acre of land have all increased thanks to a tremendous increase in the resource throughput (fertilizer, pesticides, water, energy to run machinery). Productivity per unit of throughput has actually fallen as its volume increased in order to raise the productivity of the complementary factors. Certainly the recent historical record offers no trend of increasing resource productivity to fuel the optimists' pipe dreams. The only basis for any optimism at all on this score is that, precisely because we have been so negligent of resource productivity, there is now, as a result, considerable room for improvement. But nothing like a factor of 46, or even of 20, is visible on the horizon. And just as we sacrificed resource productivity to maximize labour and capital productivity in the past, so now the maximization of resource productivity will require some sacrifice of labor and capital productivity. The latter will be difficult because labor and capital are stronger social classes than are landlords or resource owners. With the unlamented demise of the landlord there is no longer a social class whose income is tied to resource productivity. The government must take on this role and raise the price, productivity, and income derived from resources. Resource rents would no longer accrue as unearned income to a privileged class, but as public revenue.

Indeed there are many reasons to shift taxes away from income and on to consumption. Many economists advocate a value added tax. From our perspective it would be better not to tax value added, but rather to tax that to which the value is added, namely the resource throughput. We should tax what we want less of (depletion, pollution, i.e., throughput), not what we want more of (income, or value added). Some argue that you have to tax value added rather than resources because resources represent such a small percentage of GNP, while value added is a large percentage. But this simply means that to raise the same revenue we must tax throughput at a much higher rate than we would tax value added. No problem. Furthermore, the tax on throughput need not be "ad valorem." The only thing to worry about is not taxing our tax base out of existence. We can hardly tax throughput out of existence since it is a physical necessity. And if we succeed in reducing it somewhat through taxation, that is all to the good. But we can tax a great deal of income (value added) out of existence, and that is regrettable.

In conclusion, since technical improvement in resource efficiency by a factor of 20 to 40 is very unlikely, we can be sure that we will have to have recourse to reductions in population and affluence if we are to avoid wholesale environmental degradation. Of course, technical improvements should be pushed as far as possible, in the ways indicated by the economic/ecologic efficiency identity discussed in section II. But we should be under no illusions about the sufficiency of technical fixes to meet the problem. Indeed, until we accept the discipline of the steady state for total resource throughput (population times per capita resource use), there will be very little incentive for technology to increase any of the four ratios that determine overall ecological-economic efficiency. ■

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Uneconomic Growth in a Full World

by Herman E. Daly

That which seems to be wealth may in verity be only the gilded index of far-reaching ruin...
– John Ruskin
Unto this Last, 1862

Growth in GNP is so favored by economists that they call it "economic" growth, thus ruling out by terminological baptism the very possibility of "uneconomic" growth in GNP. But can growth in GNP in fact be uneconomic? Before answering this macroeconomic question let us consider the analogous question in microeconomics – can growth in a microeconomic activity (firm production or household consumption) be uneconomic? Of course it can. Indeed, all of microeconomics is simply a variation on the theme of seeking the optimal scale or extent of each micro activity – the point where increasing marginal cost equals declining marginal benefit, and beyond which further growth in the activity would be uneconomic because it would increase costs more than benefits. Quite aptly, the MB = MC condition is sometimes called the "when to stop rule."

But when we move to macroeconomics we no longer hear anything about optimal scale, nor about marginal costs and benefits, nor is there anything like a "when to stop rule." Instead of separate accounts of costs and benefits compared at the margin we have just one account, GNP, that conflates cost and benefits into the single category of "economic activity." The faith is that activity overwhelmingly reflects benefits. There is no macroeconomic analog of costs of activity to balance against and hold in check the growth of "activity," identified with benefits, and measured by GNP. Unique among economic magnitudes, GNP is supposed to grow forever.[2] But of course there really are costs incurred by GNP growth, even if not usually measured. There are costs of depletion, pollution, disruption of ecological life-support services, sacrifice of leisure time, disutility of some kinds of labor, destruction of community in the interests of capital mobility, takeover of habitat of other species, and running down a critical part of the inheritance of future generations. We not only fail to measure these costs, but frequently we implicitly count them as benefits, as when we include the costs of cleaning up pollution as a part of GNP, and when we fail to deduct for depreciation of renewable natural capital (productive capacity), and liquidation of nonrenewable natural capital (inventories).

There is no *a priori* reason why at the margin the costs of growth in GNP could not be greater than the benefits. In fact economic theory would lead us to expect that to eventually happen. The law of diminishing marginal utility of income tells us that we satisfy our most pressing wants first, and that each additional unit of income is dedicated to the satisfaction of a less pressing want. So the marginal benefit of growth declines. Similarly, the law of increasing marginal costs tells us that we first make use of the most productive and accessible factors of production – the most fertile land, the most concentrated and available mineral deposits, the best workers – and only use the less productive factors as growth makes it necessary. Consequently, marginal costs increase with growth. When rising marginal costs equal falling marginal benefits then we are at the optimal level of GNP, and further growth would be uneconomic – would increase costs more than it increased benefits.

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Why is this simple extension of the basic logic of microeconomics treated as inconceivable in the domain of macroeconomics?[3] Mainly because microeconomics deals with the part, and expansion of a part is limited by the opportunity cost inflicted on the rest of the whole by the growth of the part under study. Macroeconomics deals with the whole, and the growth of the whole does not inflict an opportunity cost, because there is no "rest of the whole" to suffer the cost. Ecological economists have pointed out that the macroceconomy is not the relevant whole, but is itself a subsystem, a part of the ecosystem, the larger economy of nature.

These ideas are represented in Figures I and II. Figure I shows the preanalytic vision of ecological economics – the economy as subsystem of a larger ecosystem that is finite, nongrowing, and materially closed. The ecosystem is open with respect to a flow of solar energy, but that flow is itself finite and nongrowing. There is an "empty-world" and a "full-world" version of this basic vision, reflecting the fact that people who share the same paradigm can have differing senses of urgency based on different interpretations of "the facts." Both will agree, however, that the goal is an optimal scale of the economy relative to the ecosystem. The optimal scale is that for which welfare is greatest.

We have two general sources of welfare: services of manmade capital and services of natural capital, as represented by the thick lines in Figure I. As the economy grows natural capital is transformed into manmade capital. More manmade capital results in a greater flow of services from that source. Reduced natural capital results in a smaller flow of services from that source. Moreover, as growth of the economy continues, the services from the economy grow at a decreasing rate. As rational beings we satisfy our most pressing wants first – hence the law of diminishing marginal utility. As the economy encroaches more and more on the ecosystem we must give up some ecosystem services. As rational beings we presumably will sequence our encroachments so that we sacrifice the least important ecosystem services first. This is the best case, the

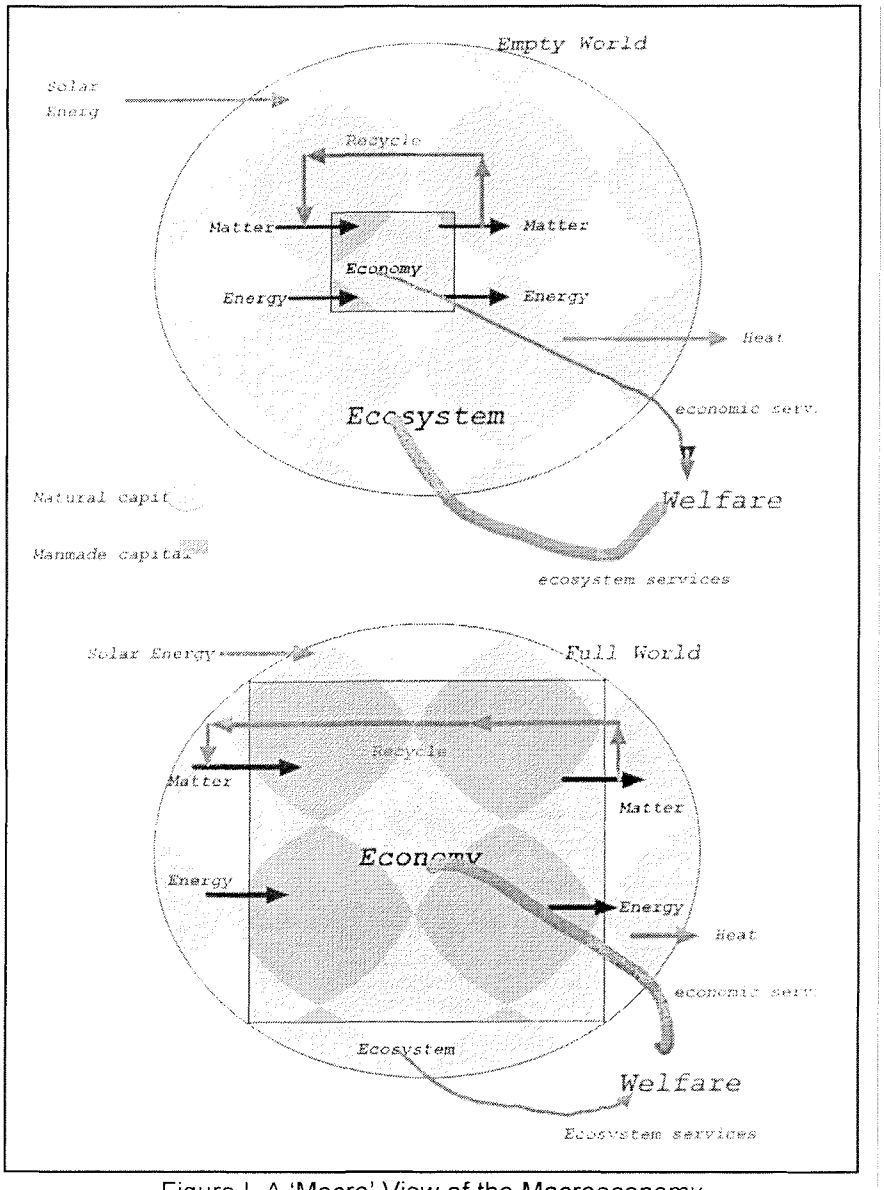

Figure I. A 'Macro' View of the Macroeconomy

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goal. In actuality we fall short of it because we do not understand very well how the ecosystem works, and have only recently begun to think of it as scarce. But the consequence of such rational sequencing is a version of the law of increasing marginal cost – for each further unit of economic expansion we must give up a more important ecosystem service. Costs increase at an increasing rate.

This first step in analysis of the preanalytic vision can be expressed graphically in a diagram (Figure II) whose basic logic goes back to William Stanley Jevons (1871) and his analysis of labor supply in terms of balancing the marginal utility of wages with the marginal disutility of labor. In Figure II the MU curve reflects the diminishing marginal utility of additions to the stock of manmade capital. The MDU curve reflects the increasing marginal cost of growth (sacrificed natural capital services, disutility of labor, disruption of community), as more natural capital is transformed into manmade capital. The optimal scale of the macroeconomy (economic limit to growth) is at point **b**, where MU = MDU, or where ab = bc, and net positive utility is a maximum.

Two further limits are noted: point **e** where MU = 0 and further growth is futile even with zero cost; and point **d**, where an ecological catastrophe is provoked, driving MDU to infinity. These "outer limits" need not occur in the order depicted. The diagram shows that growth

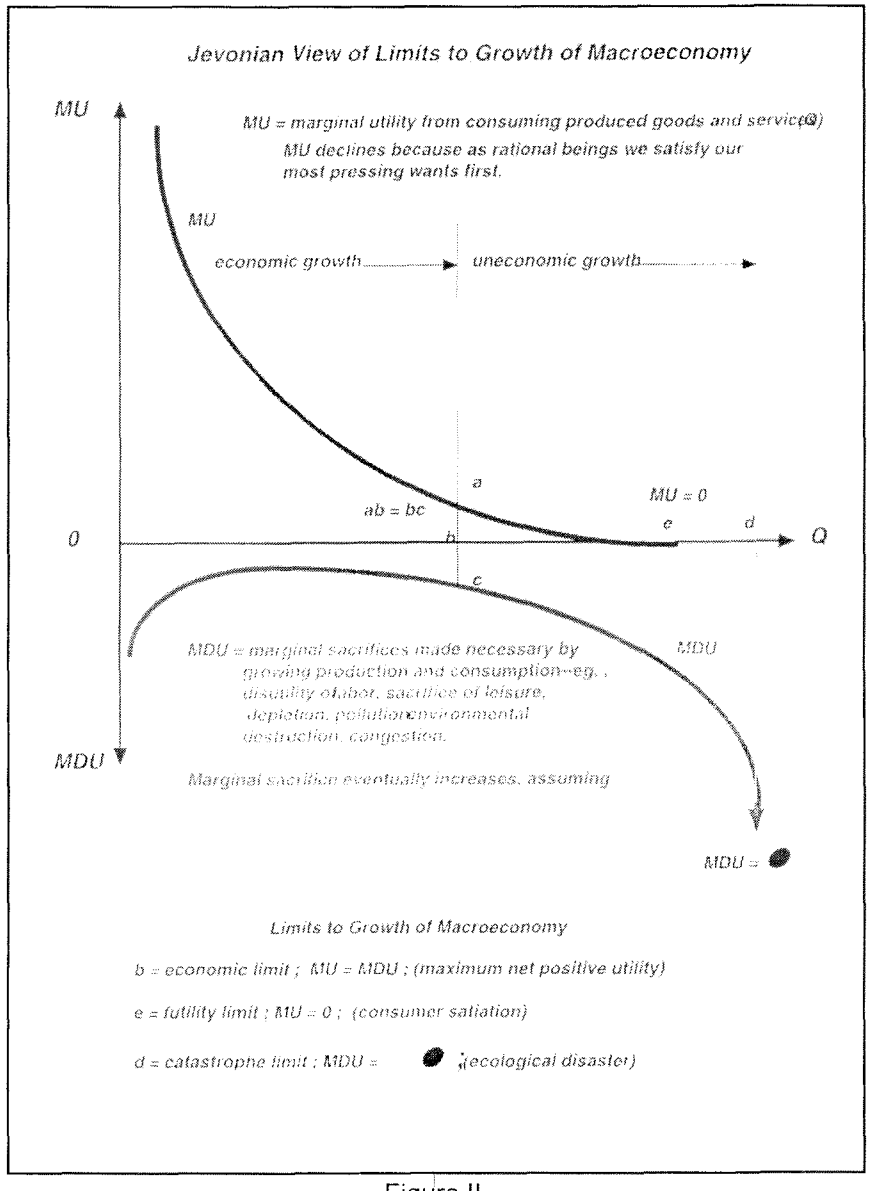
Jevonian View of Limits to Growth of Macroeconomy
MU
MU = marginal utility from consuming produced goods and services
MU declines because as rational beings we satisfy our most pressing wants first.
MU
economic growth
uneconomic growth
a
ab = bc
MU = 0
e
d
0
b
Q
c
MDU = marginal sacrifices made necessary by growing production and consumption--eg., disutility of labor, sacrifice of leisure, depletion, pollution/environmental destruction, congestion.
MDU
MDU
Marginal sacrifice eventually increases, assuming
MDU =
Limits to Growth of Macroeconomy
b = economic limit ; MU = MDU ; (maximum net positive utility)
e = futility limit ; MU = 0 ; (consumer satiation)
d = catastrophe limit ; MDU = ∞ (ecological disaster)

Figure II.

out to point **b** is literally economic growth (benefiting us more than it costs), while growth beyond point **b** is literally uneconomic growth (costing us more than it benefits). Beyond point **b**, GNP, "that which seems to be wealth" does indeed become "a gilded index of far-reaching ruin."

The concepts of optimal scale and uneconomic growth have a universal logic – they apply to the macroeconomy just as much as to microeconomic units. How did we come to forget this in macroeconomics? How did we come to ignore the existence of the MDU curve and the issue of optimal scale of the macroeconomy? I will suggest two possibilities: one is the "empty-world vision" that recognizes the logical coherence of the concept of uneconomic growth, but claims that we are not

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yet at that point – MU is still very large, and MDU is still negligible. Here we can discuss the factual evidence, as will be done in the next section.

The other possibility for explaining the total neglect of the costs of growth is a paradigm difference : the economy is simply not seen as a subsystem of the ecosystem, but rather the reverse–the ecosystem is a subsystem of the economy (Figure III). The ecosystem is merely the extractive and waste disposal sector of the economy. Even if these services become scarce growth can continue forever since technology allows us to "grow around" the ecosystem sector by substitution of manmade for natural capital, following the dictates of market prices – if and when prices of natural capital rise. Nature is really nothing but a supplier of indestructible building blocks which are substitutable and superabundant. The only limit to growth is technology, and there is, supposedly, no limit to technology, *ergo* no limit to economic growth. Therefore the very notion of "uneconomic growth" makes no sense in that paradigm. Since the economy is the whole, the growth of the economy is not at the expense of anything else – there is no opportunity cost to growth. On the contrary, growth enlarges the total to be shared by the different sectors or subsystems. Growth does not increase the scarcity of anything, rather it diminishes the scarcity of everything! How can one possibly oppose growth?? Growth forever, or a steady state

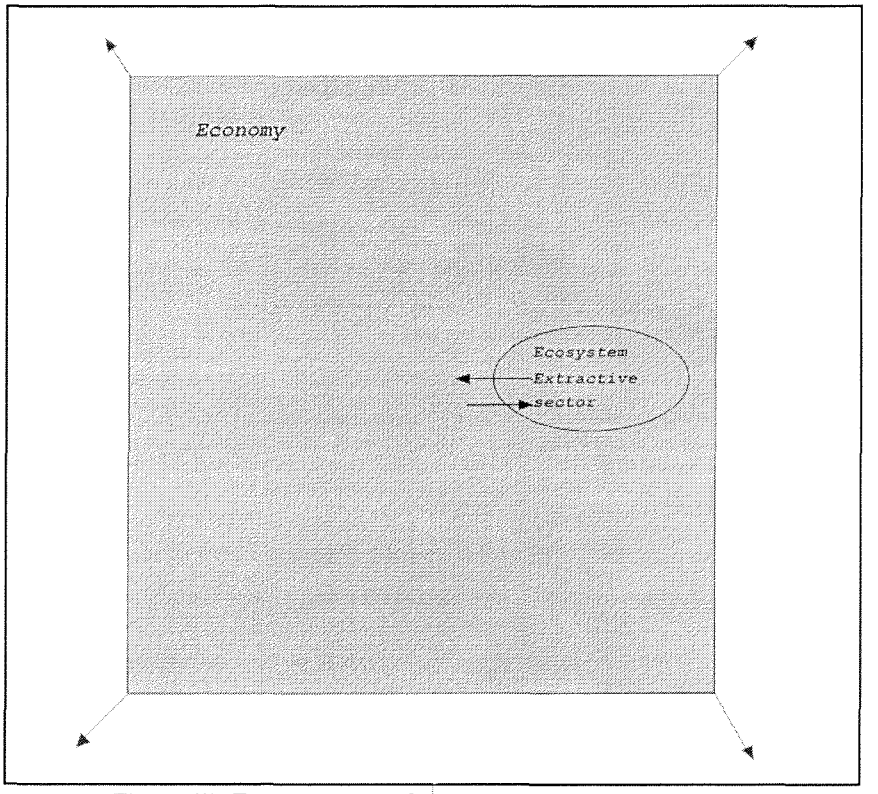

Figure III. Ecosystem as Subsystem of Macroeconomy

at optimal scale? Each is logical within its own preanalytic vision, and absurd from the viewpoint of the other. We will return later to the paradigm issue, but first let us consider some evidence in favor of the full-world version of the preanalytic vision of ecological economics.

Uneconomic Growth in Fact

As noted above one might accept the theoretical possibility of uneconomic growth, but argue that it is irrelevant for practical purposes since, it could be alleged, we are nowhere near the optimal scale. We are thought to be far to the left of point **b** in Figure I – where the benefits of growth are still enormous and the costs still trivial at the margin. Economists all agree that GNP was not designed to be a measure of welfare, but only of activity. Nevertheless they assume that welfare is positively correlated with activity, so that increasing GNP will increase welfare, even if not on a one-for-one basis. This is equivalent to believing that the marginal benefit of GNP growth is greater than the marginal cost. This belief can be put to an empirical test. The results turn out not to support the belief.

Evidence for doubting the positive correlation between GNP and welfare in the United States is taken from from two sources.

First Nordhaus and Tobin[4] asked, "Is Growth Obsolete?" as a measure of welfare, hence as a proper guiding objective of policy. To answer their question

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they developed a direct index of welfare, called Measured Economic Welfare (MEW) and tested its correlation with GNP over the period 1929-1965. They found that, for the period as a whole, GNP and MEW were indeed positively correlated – for every six units of increase in GNP there was, on average, a four unit increase in MEW. Economists breathed a sigh of relief, forgot about MEW, and concentrated again on GNP. Although GNP was not designed as a measure of welfare, it was and still is thought to be sufficiently well correlated with welfare to serve as a practical guide for policy.

Some twenty years later John Cobb, Clifford Cobb, and I revisited the issue and began development of our Index of Sustainable Economic Welfare (ISEW) with a review of the Nordhaus and Tobin MEW. We discovered that if one takes only the latter half of their time series (i.e., the eighteen years from 1947-1965) the positive correlation between GNP and MEW *falls* dramatically. In this most recent period – surely the more relevant for projections into the future – a six unit increase in GNP yielded on average only a one unit increase in MEW. This suggests that GNP growth at this stage of United States history may be a quite inefficient way of improving economic welfare –certainly less efficient than in the past.

The ISEW[5] was then developed to replace MEW, since the latter omitted any correction for environmental costs, did not correct for distributional changes, and included leisure which both dominated the MEW and introduced many arbitrary valuation decisions. The ISEW, like the MEW, though less so, was positively correlated with GNP up to a point (around 1980) beyond which the correlation turned slightly negative. Neither the MEW nor ISEW considered the effect of individual country GNP growth on the *global* environment, and consequently on welfare of citizens of other countries. Neither was there any deduction for legal harmful products, such as tobacco or alcohol, nor illegal harmful products such as drugs. No deduction was made for diminishing marginal utility of income resulting from growth over time (although there was a distributional correction for the higher marginal utility of income to the poor). Such considerations would further push the correlation between GNP and welfare toward the negative. Also, GNP, MEW, and ISEW all begin with Personal Consumption. Since all three measures have in common their largest single category, there is a significant autocorrelation bias, which makes the poor correlations between GNP and the two welfare measures all the more impressive.

Measures of welfare are difficult and subject to many arbitrary judgments, so sweeping conclusions should be resisted. However, it seems fair to say that for the United States since 1947, the empirical evidence that GNP growth has increased welfare is weak, and since 1980 probably nonexistent. Consequently, any impact on welfare via policies that increase GNP growth would also be weak or nonexistent. In other words, the "great benefit", for which we are urged to sacrifice the environment, community standards, and industrial peace, appears, on closer inspection, likely not even to exist.[6]

Uneconomic Growth in Two Paradigms

Within the standard neoclassical paradigm uneconomic growth sounds like an oxymoron, or at least an anomalous category. You will not find the concept in any macroeconomics textbook. But within the paradigm of ecological economics it is an obvious possibility. Let us consider why in each case.

Neoclassical Paradigm

The paradigm or preanalytic vision of standard neoclassical economics, as noted earlier and depicted in Figure III, is that the economy is the total system, and that nature, to the extent that it is considered at all, is a sector of the economy – e.g. the extractive sector (mines, wells, forests, fisheries, agriculture, including dumps). Nature is not seen as an envelope containing, provisioning, and sustaining the economy, but as one sector of the economy similar to other sectors. If the products or services of the extractive sector should become scarce, the economy will "grow around" that particular scarcity by substituting the products of other sectors. If the substitution is difficult, new technologies, in this

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view, will be invented to make it easy.

The unimportance of nature is evidenced, in this view, by the falling relative prices of extractive products generally, and by the declining share of the extractive sector in total GNP. Beyond the initial provision of indestructible building blocks, nature is simply not important to the economy in the view of neoclassical economics.

That the above is a fair description of the neoclassical paradigm is attested by the elementary "principles of economics" textbooks, all of which present the shared preanalytic vision in their initial pages. This, of course, is the famous circular flow diagram, depicting the economy as a circular flow of exchange value between firms and households – as an isolated system in which nothing enters from outside nor exits to the outside. There is no "outside", no environment. The economic animal has neither mouth nor anus – only a closed-loop circular gut – the biological version of a perpetual motion machine! Further confirmation is found by searching the indexes of macroeconomics textbooks for any entries such as "environment", "nature," "depletion," or "pollution." The absence of such entries is nearly complete. As if to reaffirm the unimportance of nature the advanced textbook chapters on growth theory are based on a neoclassical production function in which production is represented as a function of labor and capital only, with resources totally abstracted from![7]

"Beyond the initial provision of indestructible building blocks, nature is simply not important to the economy in the view of neoclassical economics."

A personal experience confirmed to me even more forcefully just how deeply ingrained this preanalytic vision really is. I think it is worth taking the time to recount this experience, which had to do with the evolution of the World Bank's 1992 World Development Report, *Development and the Environment*.

An early draft of the 1992 *WDR* had a diagram entitled "The relationship between the economy and the environment." It consisted of a square labeled "economy," with an arrow coming in labeled "inputs" and an arrow going out labeled "outputs" – nothing more. I worked in the Environment Department of the World Bank at that time, and was asked to review and comment on the draft. I suggested that the picture was a good idea, but that it failed to show the environment, and that it would help to have a larger box containing the one depicted, and that the large box (or circle, perhaps) would represent the environment. Then the relation between the environment and the economy would be clear – specifically that the economy is a subsystem of the environment and depends on the environment both as a source of raw material inputs and as a sink for waste outputs. The text accompanying the diagram should explain that the environment physically contains and sustains the economy by regenerating the low-entropy inputs that it requires, and by absorbing the high-entropy wastes that it cannot avoid generating, as well as by supplying other systemic ecological services. Environmentally sustainable development could then be defined as development which does not destroy these natural support functions.

The second draft had the same diagram, but with an unlabeled box drawn around the economy, like a picture frame, with no change in the text. I commented that, while this was a step forward, the larger box really had to be labeled "environment" or else it was merely decorative, and that the text had to explain that the economy was related to the environment in the ways just described.

The third draft omitted the diagram altogether. There was no further effort to draw a picture of the relation of the economy and the environment. Why was it so hard to draw such a simple picture?

By coincidence a few months later the Chief Economist of the

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World Bank, under whom the 1992 *WDR* was being written, happened to be on a review panel at the Smithsonian Institution discussing the book *Beyond the Limits* (Donella Meadows, et al.). In that book there was a diagram showing the relation of the economy to the ecosystem as subsystem to total system, identical to what I had suggested (and to Figure I). In the question-and-answer time I asked the Chief Economist if, looking at that diagram, he felt that the issue of the physical size of the economic subsystem relative to the total ecosystem was important, and if he thought economists should be asking the question, "What is the optimal scale of the macro economy relative to the environment that supports it?" His reply was short and definite, "That's not the right way to look at it," he said.

Reflecting on these two experiences has strengthened my belief that the difference truly lies in our "preanalytic vision" – the way we look at it. My preanalytic vision of the economy as subsystem leads immediately to the questions: How big *is* the subsystem relative to the total system? How big *can it be* without disrupting the functioning of the total system? How big *should it be*, what is its optimal scale, beyond which further growth in scale would be uneconomic? The Chief Economist had no intention of being sucked into these subversive questions – that is not the right way to look at it, and any questions arising from that way of looking at it are simply not the right questions.

That attitude sounds rather unreasonable and peremptory, but in a way that had also been my response to the diagram in the first draft of *Development and the Environment* showing the economy receiving raw material inputs from nowhere and exporting waste outputs to nowhere. "That is not the right way to look at it," I said, and any questions arising from that picture, say, how to make the economy grow faster by speeding up throughput from an infinite source to an infinite sink, were not the right questions. Unless one has in mind the preanalytic vision of the economy as subsystem, the whole idea of sustainable development – of an economic subsystem being sustained by a larger ecosystem whose carrying capacity it must respect – makes no sense whatsoever. It was not surprising therefore that the *WDR'92* was incoherent on the subject of sustainable development, placing it in solitary confinement in a half-page box where it was implicitly defined as nothing other than "good development policy." It is the preanalytic vision of the economy as a box floating in infinite space that allows people to speak of "sustainable *growth*" (quantitative expansion) as opposed to "sustainable *development*" (qualitative improvement). The former term is a self-contradictory to those who see the economy as a subsystem of a finite and nongrowing ecosystem. The difference could not be more fundamental, more elementary, or more irreconcilable.

Ecological Economics Paradigm

This story of course leads to a consideration of the alternative paradigm, that of ecological economics within which uneconomic growth is an obvious concept. The big difference is to see the economy as a subsystem of the natural ecosystem.

The neoclassical "evidence" for the unimportance of nature (falling relative price of many natural resources, and small share of the extractive sector in GNP) is seen quite differently in the ecological economics paradigm. In an era of rapid extraction of resources their short-run supply will of course be high and their market price consequently will be low. Low resources prices are not evidence of nonscarcity and unimportance, but rather a consequence of rapid drawdown leading to increasing technological dependence on a large throughput of cheap resources.

As for the neoclassical claim that the small percentage of GNP arising from the extractive sector indicates its unimportance, one might as well claim that a building's foundation is unimportant because it represents only five percent of the height of the skyscraper erected above it. GNP is the sum of value *added* by labor and capital. But added to what? Resources are *that to which value is added* – the base or foundation upon which the skyscraper of added value is

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resting. A foundation's importance does not diminish with the growth of the structure that it supports! Nevertheless, economists habitually argue the contrary. For example, that we need not worry about global warming because the only climate-sensitive sector of the economy is agriculture, and agriculture accounts for only 3% of GNP. These economists evidently don't need to eat – perhaps they come equipped with a closed loop gut similar to what they assume in their circular flow diagram! They also need remedial reflection on the diamonds-water paradox.

If GNP growth resulted only from increments in value added to a nongrowing resource throughput, then it would likely remain *economic* growth for much longer. Such a process of qualitative improvement without quantitative increase beyond environmental capacity is what I have elsewhere[8] termed "development without growth," and suggested as a definition of "sustainable development." But that is not yet what happens in today's world. According to the World Resources Institute, et al., per capita resource requirement rose, albeit slowly, over the period 1975-93 in Germany, Japan, and The Netherlands. It also rose in the U.S. if one does not count reductions in soil erosion. Population growth in these countries is low, but not zero, giving a further boost to total throughput growth. Since current levels of resource throughput in these countries range from 45 to 85 thousand kilograms per person per year, a level already causing severe environmental degradation, it seems a bit premature to herald the advent of the "dematerialized economy."[9]

"What is not reflected in the market is the value of the optimal sustainable physical scale of the economy relative to the ecosystem."

Even new knowledge and new technology may work in both ways, enhancing or shrinking carrying capacity. New knowledge may reduce available matter-energy. For example, the greenhouse effect represents new knowledge that lowers the effective availability of fossil fuels because the capacity to absorb the dispersed CO_2 is less than previously thought. New knowledge may reveal new limits. The hole in the ozone layer is new knowledge. To suppose, as is usually done, that new knowledge will always expand the resource base and never contract it is to overspecify the content of new knowledge, which must always be something of a surprise – and not necessarily a pleasant one. Technology may lighten the load of a given scale on environmental carrying capacity and thus in effect expand it, if it allows us to squeeze more welfare from a given flow of resources. But if the new technology is the kind that simply increases the resource flow per person, then it will increase the load on carrying capacity.

What happens, according to ecological economics, is that the economy grows by transforming its environment (natural capital) into itself (manmade capital). The optimal extent of this physical transformation (optimal scale of the economy) occurs, as previously shown, when the marginal cost of natural capital reduction is equal to the marginal benefit of manmade capital increase. This process of transformation takes place within a total environment that is finite, nongrowing, and materially closed. There is a throughput of solar energy which powers biogeochemical cycles, but that energy throughput is also finite and nongrowing. As the economic subsystem grows it becomes a larger part of the total system, and therefore must conform itself more to the limits of the total system – finitude, nongrowth, and entropy. Its growth is ultimately limited by the size of the total system of which it is a part, even under neoclassical assumptions of easy substitution of manmade for natural capital.

What is not reflected in the market is the value of the optimal sustainable physical scale of the economy relative to the ecosystem. The market does not distinguish an ecologically

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sustainable scale of matter-energy throughput from an unsustainable scale, just as it does not distinguish between ethically just and unjust distribution of income. Sustainability, like justice, is a value not achievable by purely individualistic market processes. Yet these values can be reflected back into market prices when the market operates under collectively instituted macro constraints designed to protect these values to which the purely individualistic market is blind.

But if manmade and natural capital are complements rather than substitutes, as ecological economics claims, then expansion of the economic subsystem would be much more stringently limited. There would be no point in expanding manmade capital beyond the capacity of remaining natural capital to complement it.

Historically, in the "empty-world" economy, man made capital was limiting and natural capital superabundant. We have now, due to demographic and economic growth, entered the "full-world" economy, in which the roles are reversed. The fish catch used to be limited by number of fishing boats (manmade capital) but is now limited by the remaining populations of fish in the sea (natural capital). What good are more fishing boats when the fish population has become the limiting factor?

When factors are complements the one in short supply is *limiting*. If factors are substitutes then there cannot be a limiting factor. Economic logic says that we should focus attention on the limiting factor by: (a) maximizing its productivity in the short run; and (b) investing in its increase in the long run . This is a *major* implication for economic policy–economize on and invest in natural capital. Economic logic stays the same, but the identity of the limiting factor has gradually changed from manmade to natural capital, – e.g. from fishing boats to remaining fish in the sea; from saw mills to remaining forests; from irrigation systems to aquifers or rivers; from oil well drilling rigs to pools of petroleum in the ground; from engines that burn fossil fuel to the atmosphere's capacity to absorb CO_2, etc.

Viewed from the perspective of ecological economics even the usual neoclassical assumption of easy substitution of manmade for natural capital (and consequent neglect of limiting factor phenomena) provides no argument for continual growth, even though it relaxes the tightest constraint on present growth. If manmade capital substitutes for natural capital, then natural capital substitutes for manmade capital. Substitution is reversible. If our original endowment of natural capital was a good substitute for manmade capital, then why, historically, did we go to the trouble of transforming so much natural capital into manmade capital? The issue is not substitution between two types of natural resource (like substitution between exhaustible resources and renewable resources); rather it is one of substitution of capital for resources, an entirely different matter. Easy substitution between two types of natural resource will not help the world to get along without natural resources!

Since the neoclassical production function is often explained as a technical recipe, we might say that such a recipe calls for making a cake with only the cook and his kitchen. We do not need flour, eggs, sugar, and so on, nor electricity or natural gas, nor even firewood. If we want a bigger cake, the cook simply stirs faster in a bigger bowl and cooks the empty bowl in a bigger oven that somehow heats itself. Nor does the cook have any cleaning up to do, because the production recipe produces no wastes. There are no rinds, peelings, husks, shells or residues, nor is there any waste from heat from the oven to be vented. Furthermore, we can make not only a cake, but any kind of dish – a gumbo, fried chicken, a paella, bananas foster, cherries jubilee – all without worrying about the qualitatively different ingredients, or even about the quantity of an ingredient at all! Real recipes in real cookbooks, by contrast, *begin* with a list of specific ingredients and amounts.

Neoclassical believers in easy substitution have no good answer. Nor do they have a very good answer to the question: How can you make more capital without using more resources? The problem does not arise for ecological economists because they affirm from the beginning that natural and manmade capital are basically complements and only marginally substitutes.

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The optimal scale of the economy is smaller, the greater is: (a) the degree of complementarity between natural and manmade capital; (b) our desire for direct experience of nature; and (c) our estimate of both the intrinsic and instrumental value of other species. The smaller the optimal scale of the economy, the sooner its physical growth becomes uneconomic.

From Permitting Growth, to Mandating Growth, to Limiting Growth

The neoclassical paradigm permits growth forever but does not really mandate it. Historically, what pushed the growth-forever ideology was not neoclassical logic, but rather the practical answer given to the problems addressed by Malthus (overpopulation), Marx (unjust distribution), and Keynes (involuntary unemployment). Growth was the common answer to all three problems.

Overpopulation would be cured by the demographic transition. When GNP per capita reaches a certain level children become too expensive in terms of other goods forgone and the birth rate automatically falls. Economic growth is the best contraceptive, as the slogan goes. Whether the product of increased per capita consumption times the decreased birth rate of "capitas" results in increasing total consumption beyond optimal scale remains an unasked question. More concretely, is it necessary for Indian per capita consumption to rise to the Swedish level for Indian fertility to fall to the Swedish level, and if so what happens to the Indian ecosystem as a result of that level of total consumption?

Unjust distribution of wealth between classes would be rendered tolerable by growth, the rising tide that lifts all boats, to recall another slogan. Yet growth has in fact increased inequality both within and among nations. To make matters worse, even the metaphor is wrong, since a rising tide in one part of the world implies an ebbing tide somewhere else.

Unemployment would yield to increasing aggregate demand which merely required that investment be stimulated, which of course implies growth. How long can we continue to avoid unemployment by growth? Must we grow beyond optimal scale in pursuit of full employment? Another unasked question.

Continuing this time-honored tradition the World Bank's *1992 WDR* argued that more growth was also the automatic solution to the environmental problem. A so-called "environmental Kuznets curve" was discovered, which was taken to reveal an inverted U-shaped relation between GNP and a number of environmental pollutants. Consequently, one must persevere in growth because even though it initially is bad for the environment, it will later be good for the environment once we pass the hump of the inverted U.

But of course the assumption in all cases is that growth is economic, that it is making us richer rather than poorer. But now growth is becoming uneconomic. Uneconomic growth will not sustain the demographic transition and cure overpopulation. Neither will it help redress unjust distribution, nor cure unemployment. Nor will it provide extra wealth to be devoted to environmental repair and clean-up. Indirect growth-based solutions to the big problems no longer work.

We now need more direct and radical solutions to the problems of Malthus, Marx, and Keynes : population control to deal with overpopulation; redistribution to deal with excessive inequality; and measures such as a WPA-like public employer of last resort, and ecological tax reform to raise resource prices relative to labor. These must be national policies. It is utopian (or dystopian) to think of them being carried out by a world authority. Many nations have made progress in controlling their population growth, in limiting domestic income inequality, in reducing unemployment. They have also improved resource productivity by internalizing environmental and social costs into prices. But nations' efforts in this regard are undercut by the ideology of globalization – a last gasp attempt to reestablish the conditions of the empty-world economy by growing into the economic and ecological space of other countries, and into the remaining global commons. ■

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Population and Economics

A Bioeconomic Analysis

by Herman E. Daly

The concept of optimal population has an honorable place in the history of economic thought. But it no longer occupies any place at all in modern standard economic theory. The belief today is that the concept is of no interest because the niche which the human population occupies is itself expandable by human action. The main way to expand the human niche is to accumulate manmade capital. We simply transform more of the natural world, which has traditionally been considered superabundant, into manmade capital (the stock of producer goods and durable consumer goods embodying human technologies) and thereby expand our niche as fast, or faster, than we expand our numbers. The limiting factor in determining the size of our niche has traditionally been manmade capital.

But recently we have entered a new era in which the limiting factor is remaining natural capital. Economic theory has taught that natural and manmade capital are near-perfect substitutes rather than complements, so the problem of one being a limiting factor simply does not arise. Consequently, for standard economics we have not and cannot enter a new era in which natural capital has replaced manmade capital as the limitative factor, and so the old confidence that the human niche can be indefinitely expanded continues to be dogma. Yet in reality, manmade and natural capital *are* complements – for example, the manmade capital of a sawmill is complementary with the natural capital of a forest. When factors are complementary, then productive capacity is limited by the one in shortest supply – a kind of generalized Liebig's Law of the Minimum – valid for industrial as well as agricultural production. When what was previously limiting ceases to be, and what was previously superabundant becomes limiting, then behavior has to change if it is to remain *economic*. We must maximize the productivity of the factor in short supply – that used to mean maximize the productivity of manmade capital; now it means maximize the productivity of natural capital. Moreover it means that expansion of manmade capital at the expense of natural capital no longer expands the human niche – it reduces it.

How is it that we have passed such an important watershed without economics having noticed it? Three abstractions have blinded economic theorists.

First, economics naturally abstracts from whatever is not scarce. The source and sink functions of nature were not scarce when the scale of the human economy was small, and it was during this period that economics developed.

> ***"When factors are complementary, then productive capacity is limited by the one in shortest supply."***

Second, the basic preanalytic vision from which modern economic analysis begins is that of the circular flow of abstract purchasing power, with no entry or exit of either matter or energy (Georgescu-Roegen, 1971). If

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interpreted as a physical description of production and consumption, as it sometimes is in textbooks, the circular flow is in stark contradiction with the Second Law of Thermodynamics.

Third, modern neoclassical economics has taught that manmade capital is a near-perfect substitute for flow of natural resources, and consequently for the stock of natural capital that yields that flow of resources. This is a major misconception. If natural resources and manmade capital were perfect substitutes then why would we ever have developed manmade capital to begin with, since we already had a perfect substitute? It is obvious that capital and resources are complements, not substitutes. There may be some very marginal substitutibility between capital and resources at the level of recycling prompt scrap, as when sawdust is collected and compressed into particle board. The capital equipment for doing this means slightly fewer trees have to be cut, because we use each tree a bit more efficiently. But this marginal substitutibility hardly alters the fact that resources and capital are on the whole complements in production. When factors are complements, production is limited by the one in shortest supply; for substitutes such a limit is nonexistent. Indeed perfect substitutes should not even be considered different factors from an economic perspective since their economic functions would be identical. The very concept of factor assumes some complementarity, or at least nonsubstitutibility.

"...expansion of manmade capital at the expense of natural capital no longer expands the human niche – it reduces it."

If the limiting factor on production is now remaining natural capital, then reducing natural capital further to make more room for manmade capital will reduce rather than increase production. More manmade capital no longer creates more living space for human beings – it uses it up. Populations of human beings, and populations of their extensions in the form of manmade capital, have always competed for available low entropy matter/energy from the environment supplied by natural capital, which was not considered capital because scarce. No longer should we maximize productivity of labor or capital by using natural resources lavishly (thus minimizing resource productivity) – rather we must move into the mode of maximizing natural resource productivity, subject to restraints imposed by a desirable or sufficient standard of living. The most practical operational way of doing this seems to be to return to the notion of optimal population, generalized a bit to arrive at the concept of optimal scale. Scale is defined in its flow dimension as population times per capita resource use. In its stock dimension, it may be thought of as the total population of humans and their artifacts – the sum total of human organs, both endosomatic and exosomatic, to use the terminology of Lotka (1956).

The maintenance of the grand total of human organs which support our life and its enjoyment requires an entropic throughput from the environment. Just as our endosomatic organs are maintained by an endosomatic digestive tract, so our exosomatic organs require an exosomatic digestive tract. Both digestive tracts convert low entropy matter/energy into high entropy matter/energy, thus placing similar burdens on the regenerative and assimilative capacities of the ecosystem. The entropic nature of the throughput of the two digestive tracts further gives the lie to the notion that more manmade capital (exosomatic organs) makes room for more endosomatic organs (human beings). They compete for the same life space. As long as that life space was very large relative to the scale of demands coming from both sources there was no problem. But human endosomatic and exosomatic capital combined now directly and indirectly preempt 25% of global net primary production (NPP) of photosynthesis of the 40% of land-based NPP (Vitousek, et al., 1986).

The notion of exosomatic

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organs is more than just a metaphor. Our lives and well being are as dependent on automobiles, airplanes, heating and cooling systems, electric and communications networks, pipelines, and sewerage systems as on our heart, liver or lungs. Both sets of organs support life and its enjoyment, and both are dissipative structures maintained in a quasi-steady-state by an entropic throughput from and back to the environment. This is well-expressed in the following quote from A. J. Lotka (1956, p. 369):

> *The most singular features of the artificial extensions of our natural body is that they are shared in common by a number of individuals. When the sick man consults the physician, who, we will say, makes a microscopic examination, for example, the patient is virtually hiring a pair of high power eyes. When you drop a nickel into a telephone box, you are hiring the use of an ear to listen to your friend's voice five or ten miles distant. When the workingman accepts a wage of forty dollars for his weekly labor, he is in fact paying to his employers an undetermined amount for the privilege of using his machines as artificial members to manufacture marketable wares.*
>
> *The modern development of artificial aids to our organs and faculties has exerted two opposing influences.*
>
> *On the one hand, it has in a most real way bound men together into one body: so very real and material is the bond that society might aptly be described as one huge multiple Siamese twin.*
>
> *On the other hand, since the control over certain portions of this common body is unevenly distributed among the separate individuals, certain of them may be said in a measure to own parts of the bodies of others, holding them in a species of refined slavery, and though neither of the two parties concerned may be clearly conscious of the fact, it is often resented in a more or less vague way by the one less favored.*

Let us continue a bit Lotka's very suggestive thoughts.

There are some further important similarities and differences between endosomatic and exosomatic organs (or endosomatic and exosomatic capital as the economist might say).

First, our exosomatic organs evolve much more rapidly than our endosomatic ones. We fly with exosomatic wings and dive with exosomatic gills.

Second, most of our exosomatic organs have evolved in dependence on stocks of minerals and fossil fuels, which in the long run are the scarcer of our two sources of low entropy, the other being solar energy (Georgescu-Roegen, 1971). More precisely, solar energy is unlimited in its stock dimension, the sun, but strictly limited in its flow dimension of arrival on earth. We have not learned to mine the sun (fortunately). Terrestrial deposits of minerals and fossil fuels, which we have learned to mine, are strictly limited in the stock dimension, but relatively unlimited in the flow dimension in the sense that for a while at least, we can use them up at a rate of our own choosing. And we have chosen to use them quickly to construct marvelous exosomatic organs, some of which we devote to further increasing the rate of extraction to make still more marvelous exosomatic organs.

Third, while ownership of endosomatic organs is very egalitarian (each person has one heart, two kidneys, etc.), exosomatic organs are owned more by some than by others, as Lotka noted. Consequently we can expect social conflict to be exacerbated as we deplete the terrestrial source of low entropy.

Social conflict up to now has been eased by more rapid growth, or at least the promise thereof. But now growth in exosomatic organs competes directly with humans for the maintenance of their endosomatic organs – witness in Brazil the competition for agricultural land between fuel for *Mechanistra automobilica* (sugar cane) and food for *Homo sapiens brasiliensus* (rice and beans). Not many years ago some scientists were claiming that we would be converting petroleum into food to feed the world. Georgescu-Roegen, on the basis of the distinctions made above

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about the stock-flow patterns of scarcity, was able to predict just the opposite direction of substitution – food into petroleum substitutes – a reversion towards the more abundant solar source of low entropy.

If we accept that: (1) we have reached the scale beyond which exosomatic organs significantly compete with the endosomatic organs for a share of the limited stock of terrestrial low entropy, and (2) that manmade capital is not a substitute for natural capital, but rather a complement whose productivity is limited by natural capital availability, then the implications are that we should limit the scale of the human presence, and seek to maximize the productivity of resources rather than of labor or capital, and should seek to diminish poverty through wealth redistribution and population control, rather than growth.

The following policy would be a step in that direction. Enact a heavy severance tax on resources, especially fossil energy, and reduce the income tax, especially on low incomes, by the amount needed to achieve revenue neutrality. This will have the following desirable consequences: (1) The scale of resource throughput would be limited and with it the gross load on the ecosystem and the rate of takeover of habitats of other species; (2) Resource prices would increase inducing resource-saving technologies and patterns of consumption; (3) Equity would be served by reducing the income tax mainly on lower incomes, and perhaps even by instituting a negative income tax for very low income levels, financed by the resource severance tax; (4) A resource tax can raise any amount of revenue since resources are necessary for production, and a severance tax is less avoidable than an income tax; (5) Reducing taxes on income would increase both incentives to work and employment opportunities; (6) The shift from income to resource taxes could be carried out gradually, and modified according to experience.

"...we cannot have too many people alive simultaneously lest we destroy carrying capacity and thereby reduce the number of lives possible in all subsequent time periods."

Our bioeconomic analysis shows us that the scale of the human niche is limited; that scale is measured by population times per capita resource use (in flow terms), or the sum of exosomatic and endosomatic organs (in stock terms). There remains the question of how the total scale should be divided between its two components – many people with low per capita resource use, or fewer people with higher per capita resource use. This is a question of ethics and values that transcends bioeconomics. How much resource use per capita is necessary for a good life? As an ethical principle to clarify discussion of this latter issue, I suggest the following: That we should strive to maximize the cumulative number of lives ever to be lived over time at a level of per capita resource use that is sufficient for a good life. This means that we cannot have too many people alive simultaneously lest we destroy carrying capacity and thereby reduce the number of lives possible in all subsequent time periods. It also means that the basic question "What is needed for a good life?" cannot forever be avoided. Sufficiency must join efficiency as a key concept in economic thought. ■

REFERENCES

Georgescu-Roegen, Nicholas (1971). *The Entropy Law and the Economic Process*. Cambridge: Harvard University Press.

Lotka, A. J. (1956). *Elements of Mathematical Biology*. New York: Dover Publications.

Vitousek, Peter M., Ehrlich, Paul R., Ehrlich, Anne H., and Matson, Pamela A. (1986). "Human Appropriation of the Products of Photosynthesis." *BioScience*, 34, (6), 368-373.

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Selected Growth Fallacies

by Herman E. Daly

If you have eaten poison, you must get rid of the substances that are making you ill. Let us, then, apply the stomach pump to the doctrines of economic growth that we have been force-fed for decades. The best way to do that is to consider critically some growth arguments.

The verb "to grow" has become so overlaid with positive connotations that we have forgotten its first literal dictionary denotation, namely, "to spring up and develop to *maturity*." Thus the very notion of growth includes some concept of maturity or sufficiency, beyond which point physical accumulation gives way to physical maintenance; that is, growth gives way to a steady state. It is important to remember that "growth" is not synonymous with "betterment."

Can't Get Enough of that Wonderful Stuff

Americans have been told by no less an authority than the President's Council of Economic Advisors that, "If it is agreed that economic output is a good thing, it follows by definition that there is not enough of it." (Economic Report of the President, 1971, p. 92). It is evidently impossible to have too much of a good thing. If rain is good, a torrential downpour is, by definition, better! Has the council forgotten about diminishing marginal benefit and increasing marginal costs? The council admits that "growth of GNP has its costs, and beyond some point they are not worth paying" (p. 88). However, instead of raising the obvious question – What determines the optimal point and how do we know when we have reached it? – the council pontificates: "The existing propensities of the population and policies of the government constitute claims upon GNP itself that can only be satisfied by rapid economic growth" (p. 88). Apparently, "existing propensities and policies" are beyond discussion. This is growthmania.

The theoretical answer to the avoided question is clear to any economist. GNP growth should cease when decreasing marginal benefits equal increasing marginal costs. But there is no statistical series that measures the cost of GNP. This is growthmania, literally not counting the costs of growth. But the situation is even worse. We take the real costs of increasing GNP as measured by the expenditures incurred to protect ourselves from the *unwanted* side effects of production and *add* these expenditures to GNP rather than subtract them. We count costs as benefits. This is hyper-growthmania. Obviously, we should keep separate accounts of costs and benefits. But to do this would make it clear that beyond some point zero growth would be optimal, at least in the short run.

The Hair of the Dog that Bit You

One of the most popular arguments against limiting growth is that we need more growth in order to be rich enough to afford the costs of cleaning up pollution. Economist Neil Jacoby says, "A rising GNP will enable the nation more easily to bear the costs of eliminating pollution" (1970, p. 42). Yale economist Henry Wallich makes a similar point:

> *The environment will also be better taken care of if the economy grows. Nothing could cut more dangerously into the resources that must be devoted to the Great Cleanup than an attempt to limit resources available for consumption. By...allowing everybody to have more, we shall also have more resources to do the*

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environmental job (Wallich, 1972, p. 62).

No one can deny that if we were truly richer, our economic problems would be more easily solved. The question is whether further growth in GNP will *in fact* make us richer. It may well make us poorer. How do we know that it will not, since we do not bother to measure the costs and even count many real costs as benefits? These critics simply assume that a rising per capita GNP is making us better off, when that is the very question at issue!

"Environmental degradation is an iatrogenic disease induced by the economic physicians who attempt to treat the sickness of unlimited wants by prescribing unlimited production. We do not cure a treatment-induced disease by increasing the treatment dosage!"

If marginal benefits of physical growth decline while marginal costs rise (as economic theory would indicate), there will be an intersection beyond which further growth is uneconomic. The richer the society (the more it has grown in the past), the more likely it is that marginal benefits are below marginal costs and that further growth is uneconomic. That marginal benefits fall follows from the simple fact that sensible people satisfy their most pressing wants first, whether in alternative uses of a single commodity or in alternative uses of income. That marginal costs rise follows from the fact that sensible people first exploit the most accessible land and minerals known to them, and that when sacrifices are imposed by the increase of any one activity, sensible people will sacrifice the least important alternative activities first. Thus marginal benefits of economic activity fall while marginal costs rise.

The best attack on this argument is to argue that the cost and benefit curves continually shift apart so that the intersection always stays ahead of us, and thus growth remains economic. But there are physical limits to efficiency (how far down cost curves can be shifted), and our rush toward exotic growth-permitting technologies, such as fission power and breeder reactors, is more likely to push the cost curve up than down, once all costs are counted. Moreover, our efforts to push the benefit curve up by creating new wants too rapidly and too artificially are more likely to pull the curve down than to push it up. But even ignoring the possibility that the curves could shift in perverse directions, and assuming *very unrealistically* that the benefit curve will forever shift upward and the cost curve downward, there is *still* the question of timing. Why must the curves always shift *before* we reach the intersection? Might not technical progress occasionally be delayed?

Environmental degradation is an iatrogenic disease induced by the economic physicians who attempt to treat the sickness of unlimited wants by prescribing unlimited production. We do not cure a treatment-induced disease by increasing the treatment dosage!

Consistent Inconsistencies and Avoiding the Main Issues

Growthmen claim that no economist worth his salt confuses GNP with welfare. Consider, however, the following four statements from the same article (Nordhaus and Tobin, 1970):

(1) *Gross National Product is not a measure of economic welfare ... maximization of GNP is not a proper objective of economic policy ... Economists all know that ...* [p. 6].

(2) *Although GNP and other national income aggregates are imperfect measures of welfare, the broad picture of secular progress which they*

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convey remains after correction of their most obvious deficiencies [p. 25].

(3) *But for all its shortcomings, national output is about the only broadly based index of economic welfare that has been constructed* [p. 1, Appendix A].

(4) *There is no evidence to support the claim that welfare has grown less rapidly than NNP (Net National Product). Rather NNP seems to underestimate the gain in welfare, chiefly because of the omission of leisure from consumption. Subject to the limitations of the estimates we conclude that the economic welfare of the average American has been growing at a rate which doubles every thirty years* [p. 12].

It is asking too much of context and qualification to reconcile statement 1 with 2, 3, and 4. Either GNP (or NNP) *is* an index of welfare, or it is *not*. The authors clearly believe that it *is*. They offer sensible adjustments to make GNP a better measure of welfare. But all of this avoids the fundamental objection that GNP-flow is largely a *cost*. Wants are satisfied by the services of the *stock* of wealth. The annual production flow is the *cost* of maintaining the stock and, though necessary, should be minimized for any given stock level. If we want the stock to grow, we must pay the added cost of a greater production flow (more depletion, more labor, and ultimately more pollution). Depletion, labor, and pollution are real costs that vary directly with the GNP-throughput. If we must have some indices of welfare, why not take total stock per capita and the ratio of total stock to throughput flow? Welfare varies directly with the stock, inversely with the flow. Beyond some point, the benefits of additions to the stock will not be worth the costs in terms of additional maintenance throughput.

Kenneth Boulding has long argued that Gross National Product is largely Gross National Cost and has never been taken seriously. If this way of looking at things is wrong, why doesn't some economist refute it instead of avoiding it?

The source of this flow fetishism of orthodox economics is twofold. First, it is a natural concomitant of early stages of ecological succession (Odum, 1969). Young ecosystems (and cowboy economies) tend to maximize production efficiency, that is, the ratio of annual flow of biomass produced to the preexisting biomass stock that produced it. Mature ecosystems (and spaceman economies) tend to maximize the inverse ratio of existing biomass stock to annual biomass flow that maintains it. The latter ratio increases as maintenance efficiency increases. Economic theory is lagging behind ecological succession. Second, concentrating on flows takes attention away from the very unequally distributed stock of wealth that is the real source of economic power. The income flow is unequally distributed also, but at least everyone gets some part of it, and marginal productivity theory makes it appear rather fair. Redistribution of income is liberal. Redistribution of wealth is radical. Politically, it is safer to keep income at the center of analysis, because not everyone owns a piece of the productive stock, and there is no theory explaining wealth distribution. Putting stocks at the center of analysis might raise impolite questions.

Misplaced Concreteness and Technological Salvation

Technology is the rock upon which the Growthmen built their church. Since rocks are concrete entities, it is natural that Growthmen should begin to endow technology with a certain metaphorical concreteness, speaking of it as a *thing* that grows in *quantity*. From there, it is but a short step to ask whether this thing has grown exponentially, and to consult econometrics and discover that indeed it has! Next, we can conceive of technology as a sort of antibody to the pollution and depletion germs. Ultimately, we conclude that depleting and polluting activities (production and consumption) can continue to grow exponentially, because we have a problem-solving antiparticle, technology, which can also grow exponentially!

Is this an unfair caricature? Consider the following statement

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from a review of *Limits to Growth* (Meadows et al, 1972) by two economists and a lawyer:

> *While the team's world model hypothesizes exponential growth for industrial and agricultural needs, it places arbitrary, nonexponential limits on the technical progress that might accommodate these needs.*
>
> *...It is true that exponential growth cannot go on forever if technology does not keep up, and if that is the case we might save ourselves much misery by stopping before we reach the limits. But there is no particular criterion beyond myopia on which to base that speculation. Malthus was wrong; food capacity has kept up with population. While no one knows for certain, technical progress shows no signs of slowing down. The best econometric estimates suggest that it is indeed growing exponentially* (Passell et al., 1972, p. 12).

These few sentences unite in one short space so many of the misconceptions of orthodox Growthmen. Note that technology has become an exponentially growing *quantity* of some *thing* that solves problems but does not create any. Note the clear implication that exponential growth could go on forever if technology (that problem-solving antiparticle) can keep up. Can it in fact keep up? Consult a nameless econometrician and behold! It has in the past, so it probably will in the future. Most econometricians are more cautious in view of the fact that technological change cannot be directly measured but it is merely the unexplained residual in their regressions after they have included as many measurable factors and dummy variables as they can think of. Sometimes the residual technology component even includes the effect of increased raw material inputs! Note also the blind assertion that Malthus was wrong, when in fact his predictions have been painfully verified by the majority of mankind.

"In fact, the law of conservation of matter and energy by itself should make us skeptical of the claim that real output can increase continuously with no increase in real inputs."

That technology accounts for half or more of the observed increase in output in recent times is a finding about which econometricians themselves disagree. For example, D. W. Jorgenson and Z. Grilliches found that "if real product and real factor input are accurately accounted for, the observed growth in total factor productivity is negligible" (1967). In other words, the increment in real output from 1945 to 1965 is almost totally explained (96.7 percent) by increments in real inputs, with very little residual (3.3 percent) left to impute to technical change. After taking account of critical reviews of their study, Jorgenson and Grilliches admitted the likelihood that a greater role was played by technological change but reaffirmed their basic conclusion "that total factor input, not productivity change, predominates in the explanation of the growth of output" (Jorgenson and Grilliches, 1972, p. 111). Such findings cast doubt on the notion that technology, unaided by increased resource flows, can give us enormous increases in output. In fact, the law of conservation of matter and energy by itself should make us skeptical of the claim that real output can increase continuously with no increase in real inputs.

Two-Factor Models with Free Resources and Funds that are Nearly Perfect Substitutes for Flows

Economists routinely measure the productivity of the fund factors, labor and capital (and Ricardian land). But the productivity of the flow factors, natural raw materials and inanimate energy is seldom spoken of, much less calculated. This reflects an assumption that they are not scarce, that they are the free and inexhaustible gifts of

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nature. The only limit to the flow of product is assumed to be the capacity of the fund factors to process the inputs into products. Nordhaus and Tobin are explicit on this point:

> *The prevailing standard model of growth assumes that there are no limits on the feasibility of expanding the supplies of nonhuman agents of production. It is basically a two-factor model in which production depends only on labor and reproducible capital. Land and resources, the third member of the classical triad, have generally been dropped* (Nordhaus and Tobin, 1970, p. 14).

How is this neglect of resource flows justified? According to Nordhaus and Tobin, "the tacit justification has been that reproducible capital is a near perfect substitute for land and other exhaustible resources." (p. 15) If factors are near perfect substitutes, then there is, of course, no point in considering them separate factors. From the point of view of economic analysis they are identical. But it is very odd to have such an identity between factors whose very dimensionality is different. Capital is a fund, material and energy resources are flows. The fund processes the flow and is the instrument for transforming the flow from raw materials to commodities. The two are obviously complements in any given technology. But allowing for technological change does not alter the relationship. The usual reason for expanding (or redesigning) the capital fund is to process a larger, not a smaller, flow of resources, which we would expect if capital and resources were substitutes. New technology embodied in new capital may also permit processing different materials, but this is the substitution of one resource flow for another not the substitution of a capital fund for a resource flow.

Nordhaus and Tobin state that the "tacit assumption of environmentalists is that no substitutes are available for natural resources" (p.15). They consider this an extreme position, but what substitute is there for natural resources? They offer "reproducible capital;" however, in addition to requiring natural resources for their very reproduction, capital funds are clearly complements to resource flows, not substitutes. The fact that one resource flow may substitute for another, if the capital fund is redesigned to allow it, is no basis for saying that the generic factor of capital is a substitute for the generic factor of natural resource! After we deplete one resource, we redesign our machines and set about depleting another. The assumption is that in the aggregate resources are infinite, that when one flow dries up there will always be another, and that technology will always find cheap ways to exploit the next resource. When the whales are gone, we will hunt dolphins, and so on until we are farming plankton. The ecologists tell us that it will not work, that there are other limits involved, and even if it would work, who wants it? But Nordhaus and Tobin see little connection between economic growth and ecological catastrophe: "As for the danger of global ecological catastrophe, there is probably very little that economics can say." (1970, p. 20) As long as economic growth models continue to assume away the absolute dimension of scarcity, this is quite true and is simply another way of saying that current growth economics has uncoupled itself from the world and has become irrelevant. Worse, it has become a blind guide.

Present Value and Positive Feedback

It is sometimes argued that the market provides for conservation by offering high profits to farsighted speculators who buy up materials and resell them later at a high price. There are at least two flaws in this argument:

First, exponentially growing extraction leads to "unexpectedly" sudden exhaustion. Suppose the doubling time of the cumulative total amount extracted is on the order of 30 years, as it apparently is for many resources, and that there is enough of the resource to last for 300 years at present growth rates. At the end of 270 years the resource would only be half depleted. Yet in the final 30 years it would go from half to total depletion. Most resource owners probably find that surprising. For linear trends, the past is a good guide to the future. For exponential growth, the past

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is a deceptive guide to the future.

Second, the future profit must be discounted to its present value. The investor has the alternative in an expanding economy of depleting now and investing the short-term profits in another line that will earn the expected going rate, which will be close to the growth rate of the economy. The discount rate he applies to future profit is the same as the rate at which he would expect his reinvested short-term profits to grow. This expected rate is determined largely by the current rate and by recent changes in it. The result is that high and increasing current growth rates, based on high and increasing current depletion rates, lead to high and increasing discount rates applied to future values. The last condition in turn leads to a low incentive to conserve, which feeds back to high current depletion and growth rates, high discount rates, and so forth. Present value calculations thus have an element of positive feedback that is destabilizing from the point of view of conservation. Financial prudence usually advises depleting now and investing short-term earnings in depleting some other resource. The presumption again is infinite resources. There will always be more resources available to feed the march of compound interest. This tacit assumption sometimes becomes explicit, as in the following statement from the president of a great oil company:

> *The fact seems to be that the first [resource] storehouse in which man found himself was only one of a series. As he used up what was piled in that first room, he found he could fashion a key to open a door into a much larger room. And as he used up the contents of this larger room, he discovered there was another room beyond, larger still. The room in which we stand at the middle of the twentieth century is so vast that its walls are beyond sight. Yet it is probably still quite near the beginning of the whole series of storehouses. It is not inconceivable that the entire globe —earth, ocean and air —represents raw material for mankind to utilize with more and more ingenuity and skill* (Quoted in Ordway, 1953, p. 28).

Even if this were correct, we should add that eventually we must *live* in the same rooms we work in. Living in intimate contact with garbage and noxious wastes is a by-product of growth. But optimists will argue that there is another infinite series of ever larger garbage dumps! The conceptual basis of the growth faith is a generalization of the chain-letter swindle.

Pascal's Wager Revisited

Growthmania rests on the hypothesis that technological change can become entirely problem solving and not at all problem creating and can continually perform successively more impressive encores as resources are depleted. There is sufficient evidence to make reasonable people quite doubtful about this hypothesis. Yet it cannot be definitely disproved. There is a certain amount of faith involved, and faith is risky. Let us then take a completely agnostic position and apply the logic of Pascal's wager and statistical decision theory. We can err in two ways: we can accept the omnipotent technology hypothesis and then discover that it is false, or we can reject it and later discover that it is true. Which error do we most wish to avoid? If we accept the false hypothesis, the result will be catastrophic. If we reject the true hypothesis, we will forgo marginal satisfactions and will have to learn to share, which, though difficult, might well be good for us. If we later discover that the hypothesis is true, we could always resume growth. Thus even in the agnostic case, it would seem prudent to reject the omnipotent technology hypothesis, along with its corollary that reproducible capital is a near-perfect substitute for resources.

The Fallacy of Exponentially Increasing Natural Resource Productivity

Robert Solow has defended growth by appealing to increasing resource productivity. Solow concludes "there is really no reason why we should not think of the productivity of natural resources as increasing more or less exponentially over time"

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(1973, p. 51). This remarkable conclusion, if true, would be a boon to those who advocate limiting the throughput of resources, because it would mean that such a limit is totally consistent with continued exponential growth in GNP and is therefore not such a radical proposal. The resource flow could be stabilized and GNP could continue to grow exponentially as resource productivity (i.e., GNP/resource flow) increased exponentially. Why, then, does limiting the resource flow provoke such strong opposition from growth economists?

Solow's arguments to support his conclusion are interesting. If the productivity of labor is measured by GNP/labor, he reasons, the productivity of iron is measured by GNP/iron output, that of aluminum by GNP/aluminum output, and so on. He calculates what has happened to the productivities of a number of resources between 1950 and 1970 and finds that some (iron, manganese, copper, lead, zinc, bituminous coal) have increased, while others (nickel, petroleum) have remained the same and still others (aluminum, natural gas, electric power, columbium) have fallen. On the face of it, the evidence supports no generalization about resource productivity at all, even accepting Solow's definitions. But even more damaging is a hard look at the facile analogy between labor productivity and coal productivity, columbium productivity, and so forth, insofar as particular resource productivities are supposed to add up to, or convey some notion of, aggregate resource productivity, which is what Solow's conclusion clearly requires that it should do.

If the amount of labor used goes up, *ceteris paribus*, the labor productivity goes down. If the quantity of all resources used goes up, then *ceteris paribus*, the productivity of aggregate resources likewise goes down. But the productivity of many *particular* resources will still increase if the GNP increased faster than the quantity of that resource used. Furthermore, the increase in GNP is in part made possible by the more rapid increase in quantity used of those particular resources whose productivities consequently fell.

The meaning of these "resource productivities" is further obscured: "Sooner or later, the productivity of oil will rise out of sight, because the production and consumption of oil will eventually dwindle toward zero, but real GNP will not" (p. 51). Presumably, when production and consumption of oil approach zero, oil productivity will become infinite! The conclusion to be drawn is certainly not that increasing productivity compensates for diminishing supply of resources – otherwise we would be better off with nearly zero output of petroleum, which is absurd.

In his Richard T. Ely Lecture to the American Economic Association, Solow went so far as to proclaim not only the conditional possibility, but the empirical likelihood that "the world can, in effect, get along without natural resources." Solow elaborates that this is so if we have a "backstop technology," such as breeder reactors, which will mean that "at some finite cost, production can be freed of dependence on exhaustible resources altogether" (1974, p. 11). Apparently, the world cannot get along without all natural resources, as he first suggested, but only without exhaustible ones. Just how to build and maintain a backstop technology of breeder reactors (the only example offered) without such exhaustible resources such as copper, zirconium, tungsten, and iron, not to mention initial stocks of enriched uranium or permanent depositories for radioactive wastes, is not explained. No doubt it is true that at "some finite cost" we could live on renewable resources, as mankind essentially did before the industrial revolution. But the finite cost is going to include a reduction in population and in per capita consumption levels, or, at the very least, a cessation of further growth.

The belief in the unlimited productivity of natural resources and the unlimited substitutability of other factors for natural resources has led Nicholas Georgescu-Roegen to the following verdict on Solow and the many other economists for whom he is the spokesman:

> *One must have a very erroneous view of the economic process as a whole not to see that there are no*

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material factors other than natural resources. To maintain further that "the world can, in effect, get along without natural resources" is to ignore the difference between the actual world and the Garden of Eden (Georgescu-Roegen, 1975, p. 361).

The Ever Expanding Service Sector and "Angelized GNP"

Advocates of growth frequently appeal to the increasing importance of services, which, it is assumed, can continue to grow indefinitely, since such activities are presumably nonpolluting and non-depleting. Thus while agriculture and industry will be limited by their necessary pollution and depletion flows, services are allegedly not so limited and will continue to grow. Therefore, an ever-larger fraction of total GNP will originate in the service sector, and consequently the pollution and depletion flows per average dollar of GNP will fall continuously. Presumably, we will approach a nonphysical "angelized GNP."

While some activities are more throughput-intensive than others, it is not clear that these activities are always services, nor is it clear that the differences are very great once indirect effects are incorporated. Eric Hirst found that "services associated with food used almost as much energy as did farming and processing" (1974, p. 135). It is likely that when we add all the indirect as well as the direct aspects of service activities (inputs to service sector, inputs to inputs of service sector, etc.), we will find that services do not pollute or deplete significantly less than many industrial activities. That most services require a substantial physical base is evident from casual observation of a university, a hospital, an insurance company, a barbershop, or even a symphony orchestra. Certainly the incomes earned by people in the service sector will not all be spent on services but on goods as well.

It is true that "In 1969 a dollar's worth of GNP was produced with one-half the materials used to produce a dollar's worth of 1900 GNP, in constant dollars" (National Commission on Materials Policy, 1973, p. 3-3). Nevertheless, over the same period total materials consumption increased by 400 percent. We must resist being carried away by the halving of the material content of a GNP dollar. Remember the man who bought a new stove that cut his fuel bill in half and then reasoned that he could cut his fuel bill to zero by buying another such stove! More significant than the halving of the materials per dollar of GNP is the quintupling of the absolute material throughput and the similar increase in energy throughput over the same period.

The idea of growth overcoming physical limits by angelizing GNP is equivalent to overcoming physical limits to population growth by reducing the throughput intensity or metabolism of human beings. First pygmies, then Tom Thumbs, then big molecules, then pure spirits. Indeed, it would be necessary for us to become angels in order to subsist on angelized GNP.

What Second Law?

Economists often disregard the second law of thermodynamics.

In an article defending growth, Harvard economist Richard Zeckhauser tells us "Recycling is not the solution for oil, because the alternate technology of nuclear power generation is cheaper" (1973, p. 117, n. 11). The clear meaning is that recycling oil as an energy source is possible but just happens to be uneconomical, because nuclear energy is cheaper. The real reason that energy from oil, or any other source, is not recycled is of course the entropy law, not the relative price of nuclear power. This nonsensical statement is not just a minor slip-up; it indicates a fundamental lack of appreciation of the physical facts of life. No wonder Zeckhauser is unconvinced by limits to growth arguments; if he is unaware of the entropy law he could not possibly feel the weight of the arguments against which he is reacting.

An article entitled "The Environment in Economics: A Survey" begins, "Man has probably always worried about his environment because he was once totally dependent on it" (Fisher and Peterson, 1976, p. 1). The implication is that man is no longer totally dependent on his environment, or at least has become less dependent. But, in fact, technology has merely

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substituted nonrenewable resources for renewables, which is more an increase than a decrease in dependence. How could man possibly become more independent of his environment without shutting off exchanges with the environment or reducing depletion and pollution, rather than increasing them? For man to exist as a closed system, making no exchanges with the environment, would require suspension of the second law. Man is an open system. What was man three months ago is now environment; what was environment yesterday is man today. Man and environment are so interdependent it is hard to say where one begins and the other ends. This interdependence has not diminished and will not, regardless of technology.

The statement by Barnett and Morse that "Nature imposes particular scarcities, not an inescapable general scarcity," is about as clear a denial of the second law as could be imagined. To drive the point home they add:

> *Science by making the resource base more homogeneous erases the restrictions once thought to reside in the lack of homogeneity. In a neo-Ricardian world, it seems, the particular resources with which one starts increasingly become a matter of indifference ... Advances in fundamental science have made it possible to take advantage of the uniformity of energy/matter — a uniformity that makes it feasible without preassignable limit to escape the quantitative constraints imposed by the character of the earth's crust* (Barnett and Morse, 1973, p. 11).

It is, however, not the uniformity of matter-energy that makes for usefulness, but precisely the opposite: differences in concentration and temperature. If all materials and energy were uniformly distributed in thermodynamic equilibrium, the resulting "homogeneous resource base" would be no resource at all.

There would be a complete absence of potential for any process, including life. The economist's notion of infinite substitutability bears some resemblance to the old alchemists' dream of converting base metals into precious metals. All you have to do is rearrange atoms! But the potential for rearranging atoms is itself scarce, so the mere fact that everything is made up of the same homogeneous building blocks does not abolish scarcity. Only Maxwell's Sorting-Demon could turn a pile of atoms into a resource, and the entropy law tells us that Maxwell's Demon does not exist. ■

A Mind-boggling Job for Homeland Security

The U.S. Customs Service is now part of the new Department of Homeland Security. According to their general statistics for 2002 the U.S. Customs Service, on a typical DAY, processed the following:*

Over 1.1 Million Passengers
Over 57,000 Trucks/Containers
580 Vessels
2,459 Aircraft
323,622 Vehicles

What a staggering volume of traffic to be inspected for contraband, instruments of terror, and communicable diseases.

**Source: Customs and Border Protection Division of the U.S. Department of Homeland Security (CBP.gov).*

There are 301 Ports of Entry to the United States. And on the subject of disease control, the Division of Global Migration and Quarantine is currently part of the CDC's (Center for Disease Control) National Center for Infectious Diseases headquartered in Atlanta. According to Robert J. Howard, MS, MPH, with a staff of 42 at the Atlanta offices and only 39 employees in the field, the division is expected to detain, medically examine, or conditionally release individuals or wildlife suspected of carrying an infectious disease. Diseases listed as "quarantinable" are cholera, plague, diphtheria, infectious tuberculosis, small pox, yellow fever, and viral hemorrhagic fevers such as Ebola or Marburg.

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Ultimate Confusion

The economics of Julian Simon

by Herman E. Daly

"... scribbling nonsense and dispensing hollow verbiage that fundamentally and forever rots people's brains"
– Schopenhauer, referring to Hegel

Julian Simon frequently exaggerates and makes mistakes, and he has frequently been caught at it (see references). Yet he persists. Why? No doubt because he thinks he is right. However, by making mistakes faster than his critics can correct them, he also maintains a permanent debating advantage, at least in the media. In spite of the frustration of falling further behind in the thankless clean-up job, critics have no choice but to keep on exposing his errors and exaggerations. We cannot just ignore him because the Reagan administration takes him very seriously, as evidenced by his influence on the position taken by the USA at the United Nations Conference on Population held in Mexico City.

Simons's belief in unlimited growth along with his antipathy to government (except when it subsidizes nuclear power) is exactly what Reagan and his many supporters want to hear – "keep the government off the people's backs while they accumulate wealth." Perhaps that was a reasonable view for a country engaged in settling an empty continent (forget the Indians). It is not a reasonable view for a crowded continent in which one man's production is another man's pollution, and someone else's depletion. So, in the spirit of perseverance in a worthy cause I list below a number of mistakes and exaggerations, which, once reflected on by thoughtful people, should diminish the baleful influence of Mr. Simon's popular ideas.

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Simon's Denial of Resource Finitude

This is the linchpin of Simon's position. In support of his view that "resources are not meaningfully finite," he offers two arguments, one theoretical (largely semantic), and the other empirical.

The theoretical argument is that just as there are infinitely many points on a one-inch line segment, so too there are infinitely many lines of division separating copper from non-copper in the earth. Therefore, copper is not countable. Therefore, copper is infinite. Simon reasons from infinite divisibility to infinite amount. But the infinite divisibility of a line segment does not imply infinite length. Infinitely many possible boundaries separating copper from non-copper does not imply an infinite amount of copper. It is a replay of Zeno's paradox of Achilles never catching up with the tortoise that had a finite head start. Simon would clearly have bet on the tortoise. Understandably some readers will think it unlikely that anyone would make that mistake, and will therefore suspect me of setting up a straw man. I beg such readers to turn to pages 47-49 of *The Ultimate Resource* and read them carefully.

The empirical argument is drawn largely from a study by Weinberg and Goeller, *The Age of Substitutability*, which Simon cites in support of his infinite substitutability premise. Even if copper were finite it could be thought of as if it were infinite because there are infinite possibilities of substituting other resources for copper. Of course, if the set of all resources is finite, then infinite substitutability among resources does not render the set infinite. But more important than this logical glitch is what Simon omits to tell us, namely that Weinberg and Goeller's *Age of Substitutability* is a steady state. It assumes a constant population at 2.5 times the existing population with constant world energy use at 12

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times present levels, implying a per capita world energy use of only 70 percent of current US per capita use. The scenario assumes a low-cost, abundant energy source. Moreover this high consumption steady state is the maximum that Weinberg and Goeller consider technically feasible, and they caution that it would require planning on an unprecedented scale.

In other words, the very study that Simon appeals to for empirical support of his unlimited growth via the free market position specifically rejects the notion of unlimited growth, and further cautions that such a maximum consumption steady state could not be a creature of *laissez faire*, but would require extensive planning. Such selective omissions of contrary evidence from the testimony of his own expert witnesses do not inspire confidence in Mr. Simon's eagerness to tell the whole truth.

In sum, both the theoretical and empirical arguments against finitude fail utterly. Since everything else in Simon's position depends on abolishing finitude, the game is effectively over. But other issues less central to his position beg for attention.

Entropy Doesn't Exist

If environmental sources of raw material and sinks for waste were infinite then it would not matter that the flow between them was entropic. Nor, if there were no such thing as entropy, would it matter if sources and sinks were finite, because recycling could be 100 percent. Once Simon has abolished finitude he logically does not need to deny the Second Law of Thermodynamics. But he does so anyway, for good measure:

> *Let us work mainly with energy, the hardest case from my standpoint because it (almost alone among generic resources) cannot be totally recycled.* (*In Defense* ... page 57).

The clear implication is that most non-energy resources can be totally recycled, while energy can be recycled but not totally. This is wrong. No resource can be totally recycled, and energy cannot be recycled at all (except by expending more energy than the amount recycled). Simon considers the entropy constraint irrelevant because he does not understand it. He identifies entropy only with the ultimate heat death of the universe, not with the qualitative difference between equal quantities of raw material and waste. Entropy is a measure of that irreversible qualitative difference and is relevant to economics on a day-to-day basis, regardless of the ultimate heat death which we agree with Simon in not worrying about.

"Simon considers the entropy constraint irrelevant because he does not understand it."

Ecology Doesn't Exist

Not a single chapter in *The Resourceful Earth* was written by an ecologist. Simon sees the natural world mainly as a source of vexations, not services. In an interview with Simon by William F. Buckley, Jr., we find the following exchange:

Simon: ...as you get greater population density, you get better transportation systems...

Buckley: You wipe out disease enclaves, too, don't you?

Simon: Pardon?

Buckley: You wipe out disease enclaves – malarial forests and that kind of stuff.

Simon: Absolutely. Thank you for mentioning it...

It would seem that the only consequence of habitat destruction is to rid the world of malaria. (Actually cutting forests, at least initially, increases the incidence of malaria since it forces mosquitoes out of the high canopy down to the ground where man is.) But the very idea that we may loose a valuable natural service is absent. In a similar vein, Simon observes that environmentalists speak of "wetlands lost," which he considers an example of persuasive labeling, whereas previously the same phenomenon was referred to, more objectively in Simon's view, as "swamps drained" (*The Ultimate Resource*, p. 312).

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Further evidence of the absence of biological understanding is provided by a stunning non sequitur. After citing the reasonable estimate that one billion species have probably become extinct over the past 3.5 billion years, he says, "If genetic extinction doomed mankind, presumably it would have died a billion deaths by now!" Again some reader probably suspects me of quoting out of context. Please read page 180 of *The Resourceful Earth*, and maybe you can make sense of it.

Population Limits Don't Exist

Again, from the interview with Buckley (p. 208):

Buckley: All right. Now, probably the most controversial part of your thesis has to do of course with population. You find yourself asserting in effect that inasmuch as that which an individual creates is almost always more than that which he consumes, the greater the number of people who inhabit the globe, the greater the per capita production. Did I get it right?

Simon: Yes.

The question is, did Simon get it right? Not by a long shot. To begin with, even if everyone produces more than he consumes, it simply does not follow that more people will raise per capita production. But that is straining out gnats. The camel we are expected to swallow is the old infinite resources claim, which of course settles the issue. How could there be limits to population size, or anything else, if resources are infinite? Since Simon's arguments against finitude of resources have already been shown to be fallacious we need not waste time proving that unlimited population growth is a bad policy. What is worth our time is to inquire why Simon believes unlimited population growth is *desirable*, as well as possible.

"Of course, for Simon these issues do not arise because he has simply declared carrying capacity to be infinite."

Misanthropy, Double Maximization and Genius

Simon values human life, and thinks of neoMalthusians as misanthropists. But most neoMalthusians would agree with Simon that ten billion people are better than two billion – as long as they are not all alive at the same time! NeoMalthusians want to maximize the cumulative total of lives ever to be lived over time at a sufficient per capita standard for a good life. Simon wants to maximize the number of people simultaneously alive. But too many people alive at once overshoots and lowers carrying capacity leading to fewer people in subsequent time periods and a lower cumulative total over time. Of course, for Simon these issues do not arise because he has simply declared carrying capacity to be infinite.

Not content to maximize population, Simon further advocates Bentham's "greatest good for the greatest number," seemingly unaware of the mathematical impossibility of double maximization. Is there no trade-off between per capita consumption and number of people? If there is you can't maximize for both. But if resources are infinite then at least both can grow faster.

Nor for Simon is there any trade-off between present and future generations: "Because we can expect future generations to be richer than we are, no matter what we do about resources, asking us to refrain from using resources now so that future generations can have them is like asking the poor to make gifts to the rich" (*The Ultimate Resource*, p. 15). And while the poor should not be expected to make gifts to the rich, neither it would seem in a world of infinite resources, is there any reason for the rich to make gifts to the poor. Note the axiomatic nature of the belief that future generations must necessarily be richer. That, of course, presupposes the answer to the whole growth debate.

A further reason adduced by Simon for population growth is the "genius argument." With

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4,000 births there is a better chance of getting an Einstein or a Mozart than with only 40 births. Inept as this argument is in ignoring the unique combination of nature and nurture underlying genius, it should at least have occurred to Simon that the chances of getting another Hitler or Caligula likewise increase.

Some Exaggerations

> *It is not entirely farfetched to compare this operation [use of U.S. public funds for population control at home and abroad] to the CIA attempts to assassinate leaders and other persons in countries with which the U.S. is at peace, without explicit approval of the American voters and taxpayers* (*The Ultimate Resource*, p. 297).

How about 'mostly' farfetched?

> *The availability of energy has been increasing, and meaningful cost has been decreasing, over the entire span of humankind's history. We expect this benign trend to continue at least until our sun ceases to shine in perhaps 7 billion years, and until the exhaustion of the supply of elemental inputs for fission (and perhaps for fusion)* (*The Resourceful Earth*, p. 25).

This from one who accuses *Global 2000* of making sweeping extrapolations!

> *You see, in the end, copper and oil come out of our minds. That's really where they are* (Buckley interview, p. 207).

One does not belittle the enormous capacities of the human mind by insisting that copper and oil are simply not ideas and really do come out of the ground. Indeed, to the extent that the human mind comes to conceive of itself as generating copper and oil out of itself, then we may legitimately claim that the mind has been depleted and polluted by "hollow verbiage that fundamentally and forever rots people's brains."

Optimal Allocations vs Optimal Scale

The Resourceful Earth is Simon's attack on *Global 2000*. The fundamental difference between the two concerns the importance of the physical scale of the economy relative to the overall ecosystem. The economy, guided by a competitive market, theoretically will attain a Pareto-optimum allocation of resources (a condition in which no one can be made better off without someone being made worse off). That is the best we can hope for from the market. But optimal allocation of resources within the economy is one thing, and optimal physical scale of the entire economy relative to the ecosystem is something else. Nothing in the market system guarantees the latter. The scale of population and per capita resource use can be doubled or halved and the market will still find an optimal allocation. The inherent growth bias of the market, especially as supplemented by Keynesian policies, will push us beyond optimal sustainable scale. But the market will keep on optimally allocating resources. The market will always be making the best of an increasingly bad situation. Relative scarcities (one resource relative to another) will always be properly measured by prices, but absolute scarcity (of all resources in general relative to the ecosystem) will increase without being registered in relative prices. For *Global 2000* this was the issue. As we grow beyond optimal scale, absolute scarcity increases, but the price system cannot, by itself, reflect the absolute dimension of scarcity.

"For Simon, of course, absolute scarcity doesn't exist since resources are infinite."

For Simon, of course, absolute scarcity doesn't exist since resources are infinite. For Simon the economic optimum coincides with a physical maximum. This by itself is very surprising and should make us skeptical. When we are also told that the physical maximum can approach infinity, our skepticism should harden into rejection. ■

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Globalization and Its Inconsistencies

by Herman E. Daly

The same economic logic of global gains from trade that is used to justify free movement of goods, services, and capital across national boundaries applies with equal force to free movement of labor (or human capital). Yet I have seen no advocacy of free migration by the WTO, IBRD or the IMF. Why should not people enjoy the same rights and privileges as goods, services, and capital? If the WTO wants foreign capital to be able to go anywhere, and once there to have the same rights as domestic capital, then why should not foreign people have the right to go anywhere and, once there, have the same rights as domestic people?

This inconsistency may have something to do with the fact that the least mobile factor of production is at a competitive disadvantage in the distributive struggle. Since the WRO, IBRD and IMF are friendlier to capital than to labor, they promote the international mobility of the former but not the latter. *The Wall Street Journal*, a special friend of capital, surprisingly yet consistently favors free migration of labor – or is it just free immigration of cheap labor into the U.S. that they favor?

At a deeper level perhaps free traders instinctively recoil from free migration because they can see the "tragedy of the commons" and destruction of existing local community that free migration would entail.

How could any national community maintain a minimum wage, a welfare program, subsidized medical care, or a public school system in the face of unlimited immigration? How could a nation punish its criminals and tax evaders if they were free to emigrate? Indeed, would it not be a lot cheaper to encourage emigration of your poor, sick, and criminals, than to run welfare programs, charity hospitals, and prisons? Or how could a country reap the benefit of educational investments in its citizens if they were free to emigrate? Would nations continue to make such investments in the face of free migration and a continuing "brain drain?" Would any country any longer try to limit its birth rate? With free migration it could never control its numbers anyway.

Few would deny that some migration is a very good thing, but we are speaking here about free migration, where "free" means "deregulated, uncontrolled, unlimited," as in free trade or free capital mobility. Some cosmopolitans think that it is immoral to make any policy distinction between citizen and non-citizen, and therefore favor free migration. They also suggest that free migration is the shortest route to their vision of the *summum bonum*, equality of wages worldwide. Fair enough; let them then answer the questions in the preceding paragraph! In my view, a more workable moral guide is that our obligation to non-citizens is to do them no

"How could any national community maintain a minimum wage, a welfare program, subsidized medical care, or a public school system in the face of unlimited immigration?"

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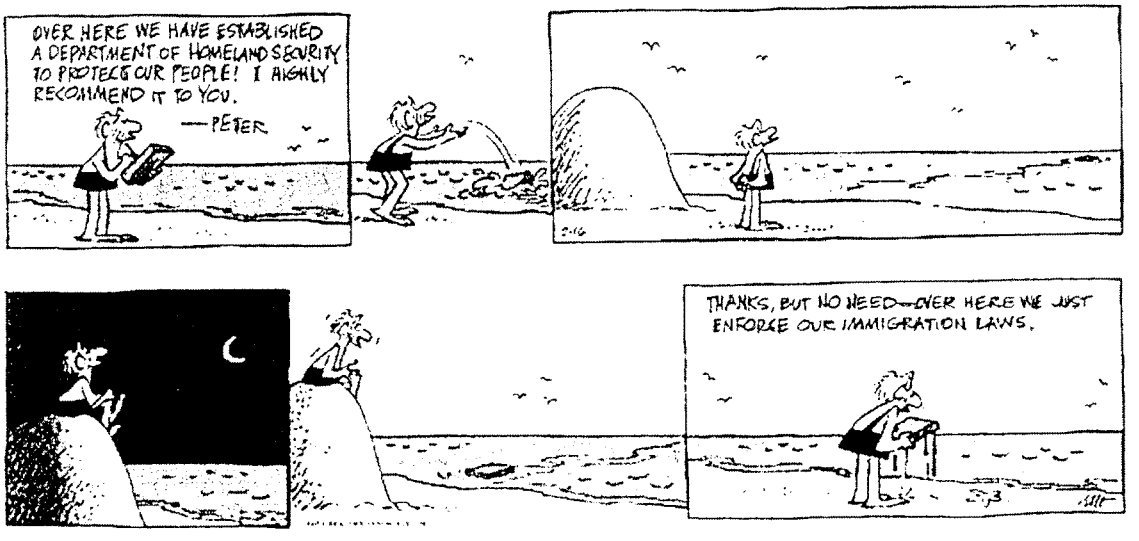
harm, while our obligation to fellow citizens is first to do no harm, and then try to do positive good. Consequences of globalization such as over-specialization in a few volatile export commodities, crushing debt burdens, and foreign corporate control of national markets, mean that the "do no harm" criterion is far from being met.

If globalization advocates refuse to follow their own logic to embrace free migration, then maybe they should consider whether their reluctance to embrace free migration might have a solid basis. They might then ask themselves if some of their misgivings might also apply to the free flow of goods, services, and capital? Markets hate boundaries, but public policy in the interest of community requires boundaries. Markets require policy and laws for their functioning, so even markets ultimately require boundaries.

Since globalization is the erasure of national borders for economic purposes, it also comes close to being the erasure of national economic policy. It implies too the erasure of international economic policy. Suppose all nations agreed to the Kyoto Accord. Try to imagine how these nations could enforce domestically what they had agreed to internationally when they have no control over their borders. Institutions of control would have to be global because the unit being controlled would be global – not in the federated sense of cooperation among nations that control their borders, but in the cosmopolitan sense of the integration of formerly separate economies into a single borderless world economy. International interdependence is to global integration as friendship is to marriage. All nations must be friends, but should not attempt multilateral marriage.

The opposite of "free trade" is not "no trade," it is regulated trade. Free trade is a rhetorically persuasive label for deregulated trade. No one is against freedom, or trade, but many are against the total deregulation of international commerce. Was deregulation of the savings and loan banks such a good idea? Has deregulation of financial markets, stock markets, and energy markets been such a success? Why has the traditional regulation of international commerce in the national interest become anathema to most economists? Do they want to abolish the nation and institute a world government? Or turn it all into a global commons for corporations to plunder? ■


OVER HERE WE HAVE ESTABLISHED A DEPARTMENT OF HOMELAND SECURITY TO PROTECT OUR PEOPLE! I HIGHLY RECOMMEND IT TO YOU.
—PETER
THANKS, BUT NO NEED—OVER HERE WE JUST ENFORCE OUR IMMIGRATION LAWS.

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Policy, Possibility, and Purpose

by Herman E. Daly

Policy presupposes knowledge of two kinds: of possibility and of purpose; of means and of ends. Possibility reflects how the world works. In addition to keeping us from wasting time and treasure on impossibilities, this kind of knowledge gives us information about tradeoffs among real alternatives. Purpose reflects desirability, our ranking of ends, our criteria for distinguishing better from worse states of the world. It does not help much to know how the world works if we cannot distinguish better from worse states of the world. Nor is it useful to pursue a better state of the world that happens to be impossible. Without both kinds of knowledge policy discussion is meaningless.

The plan of this essay is to raise two basic questions, suggest a broad answer to each, and consider objections to each answer. First, in the realm of possibility the question is, of what does our ultimate means consist? Is there a common denominator of possibility or usefulness that we can only use up and not produce, for which we are totally dependent on the natural environment? Second, what ultimately is the end or purpose in whose service we should employ these means? The question of purpose is the more difficult and will receive most emphasis. But the means question is considered first both for completeness of context, and because, surprisingly, religious attitudes arise here as well. Finally, I offer some thoughts on how contradictory premises at the basis of modern thought about possibility and purpose have enfeebled policy.

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Means and Possibility.

Ultimate means, the common denominator of all usefulness, consist of low entropy matter-energy. Low-entropy matter-energy is the physical coordinate of usefulness; the basic necessity that humans must use up but cannot create, and for which the human economy is totally dependent on nature's services. Entropy is the qualitative difference that distinguishes useful resources from an equal quantity of useless waste. We do not use up matter and energy *per se* (first law of thermodynamics), but we do irrevocably use up the quality of usefulness as we transform matter and energy to achieve our purposes (second law of thermodynamics). All technological transformations require a before and after, a gradient or metabolic flow from concentrated source to dispersed sink, from high to low temperature.[1] The capacity for entropic transformations of matter-energy to be useful are reduced both by the depletion of finite sources and by the pollution of finite sinks. If there were no entropic gradient between source and sink the environment would be incapable of serving our purposes or even sustaining our lives. Technical Knowledge helps us to use low entropy more efficiently – it does not allow us to eliminate or reverse the metabolic flow.

Matter can of course be recycled from sink back to source by using more energy (and more material implements). Energy can only be recycled by expending more energy to carry out the recycle than the amount recycled, so it is never economic to recycle energy – regardless of prices. Recycling also requires material implements for collection, concentration, and transportation. The entropic dissipation of these material instruments requires still more recycling. Nature's biogeochemical cycles powered by the sun can recycle matter to a high degree, some think a hundred percent. But this only underlines our dependence on nature's

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services, since in the human economy we have no source equivalent to the sun, and our finite sinks fill up because we are incapable of one hundred percent recycling.

There is a strong tendency to deny our dependence on nature for the basic capacity to effect our purposes in the world. Among the more explicit denials is that from George Gilder[2]:

> *Gone is the view of a thermodynamic world economy, dominated by 'natural resources' being turned to entropy and waste by human extraction and use....The key fact of knowledge is that it is anti-entropic: it accumulates and compounds as it is used.....Conquering the microcosm, the mind transcends every entropic trap and overthrows matter itself.*

According to *The Economist* (March 25, 2000, p. 73), George Gilder is "America's foremost technology prophet" whose recommendation can cause the share price of a company to increase by fifty percent the next day. If Gilder is really that influential then the current stock market boom, like most perpetual motion machines, is based on a denial of the second law of thermodynamics! To cast further doubt on Gilder's Gnostic prophecy one need only recall the aphorisms of Nobel chemist, Frederick Soddy, "No phosphorous, no thought," and of Loren Eisley, "The human mind....burns by the power of a leaf." And as Kenneth Boulding pointed out, knowledge has to be imprinted on physical structures in the form of improbable arrangements before it is effective in the economy. And only low entropy matter-energy is capable of receiving and holding for significant time periods the improbable imprint of human knowledge. Furthermore, as important as knowledge is, it is misleading to say it grows by compounding accumulation. New dollars from compound interest paid into a bank account are not offset by any decline in the principal. Yet new knowledge often renders old knowledge obsolete. Do scientific theories of phlogiston and the ether still count as knowledge? As E. J. Mishan noted, technological knowledge often unrolls the carpet of increased choice before us by the foot, while simultaneously rolling it up behind us by the yard. Yes, knowledge develops and improves, but it does not grow exponentially like money compounding in the bank. Furthermore, new knowledge need not always reveal new possibilities for growth; it can also reveal new limitations. The new knowledge of the fire-resisting properties of asbestos increased its usefulness; subsequent new knowledge of its carcinogenic properties reduced its usefulness. New knowledge can cut both ways. Finally, and most obviously, knowledge has to be actively learned and taught every generation – it cannot be passively bequeathed like an accumulating stock portfolio. When society invests little in the intergenerational transfer of knowledge, some of it is lost and its distribution becomes more concentrated, contributing to the growing inequality in the distribution of income.

The common view among economists and many others is that waste is just a resource we have not yet learned to use, that nature supplies only the indestructible building blocks of elemental atoms, and all the rest either is or can be done by humans. What counts to economists is value added by human labor and capital – that to which value is added is thought to be totally passive stuff, not even worthy of the name natural resources as evidenced by Gilder's putting the term in quotation marks. Natural processes, in this view, do not add value to the elemental building blocks – and even if they did, manmade capital can substitute for such natural services.

The brute fact remains, however, that we cannot burn the same lump of coal twice (sources are depleted), and that the resulting ashes and heat scattered into nature's sinks really are polluting wastes and not just matter-energy of equally useful potential, if only we knew how to use it. Eroded topsoil washed to the sea, and chlorofluorocarbons in the ozone layer, are also polluting wastes on a human time scale, not just "resources out of place." No one denies the enormous importance of knowledge. But this denigration

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of the importance of the physical world, and exclusive emphasis on the salvific efficacy of knowledge is a modern version of Gnosticism. It is religiously motivated by a denial of our creaturehood as part of the material world, by the belief that we have, or soon will have, transcended the world of material creation and entered an unlimited realm of esoteric knowledge, albeit technical now rather than spiritual. Hence even in the discussion of means we encounter alternative religious premises, including most prominently an ancient Christian heresy.

Ends and Desirability

It was argued above that there is such a thing as ultimate means, and that it the entropic transformation of matter-energy. Is there such a thing as an ultimate end, and if so, what is it? Like Aristotle, I think there are good reasons to believe that there must be an ultimate end, but it is far more difficult to say just what it is. In fact it will be argued that, while we must be dogmatic about the existence of the ultimate end, we must be very tolerant about our differing perceptions of it.

In an age of pluralism the first objection to the idea of ultimate end is that it is singular. Do we not have many "ultimate ends"? Clearly we have many ends, but just as clearly they conflict and we must choose among them. Furthermore, syntactically "ultimate" requires the singular. We rank ends. We prioritize. In setting priorities, in ranking things, something – only one thing – has to go in first place. That is our practical approximation to the ultimate end. What goes in second place is determined by how close it came to first place, etc. Ethics is the problem of ranking plural ends or values. The ranking criterion, the holder of first place, is the ultimate end (or its operational approximation), which grounds our understanding of objective value – better and worse as real states of the world, not just subjective opinions.

I do not claim that the ethical ranking of plural ends is necessarily done abstractly, a priori. Often the struggle with concrete problems and policy dilemmas forces decisions, and the discipline of the concrete decision helps us to implicitly rank ends whose ordering would have been too obscure in the abstract. Sometimes we have regrets and discover that our ranking really was not in accordance with a subsequently improved understanding of the ultimate end.

My point is that we must have a dogmatic belief in objective value, an objective hierarchy of ends ordered with reference to some concept of the ultimate end, however dimly we may perceive the latter. This sounds rather absolutist and intolerant to modern devotees of pluralism, but in fact it is the very basis for tolerance. If you and I disagree regarding our hierarchy of values, and we believe that objective value does not exist, then there is nothing for either of us to appeal to in an effort to persuade the other. It is simply your subjective values versus mine. I can vigorously assert my preferences and try to intimidate you into going along, but you will soon get wise to that. We are left to resort to physical combat or political manipulation, with no possibility of truly reasoning together in search of a clearer shared vision of objective value because by assumption the latter does not exist. We each know our own subjective preferences better than the other, so no clarification is needed. If the source of value is in my own subjective preferences, then I don't really care about yours, except as they may serve as means to satisfying my own. Tolerance becomes a sham, a mere strategy of manipulation, with no real openness to persuasion.[3]

"In spite of this simple rationale the concept of objective value is rejected by the modern intelligentsia."

In spite of this simple rationale the concept of objective value is rejected by the modern intelligentsia. Often it is explicitly rejected. Sometimes it is rejected implicitly by affirming determinism – if there are no real alternatives to choose among, then there is no need for a

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criterion by which to choose, so objective value becomes a fifth wheel, even though not explicitly rejected. Yet those who reject the concept of objective value have to have some alternative philosophy of value. I will argue that the incoherence of the alternatives provides indirect but strong additional support for the idea of objective value. There are, I believe, four basic alternative positions, outlined below.

(1) The perennial Judeo-Christian worldview as discussed above – real alternatives from which to choose by reference to an objective criterion of value.

(2) Criterionless choice – alternatives are real options, but there is no objective criterion for choosing among them.

(3) Providential determinism – there are no real options, but there is an objective criterion of value by which to choose, if we had a choice. Fortunately providence has chosen for us according to the objective criterion which we would not be wise or good enough to have followed on our own.

(4) Criterionless determinism – there are no real alternatives to choose from, and even if there were there is no objective criterion of value by which to choose. All is random variation and natural selection as claimed by the neodarwinists.[4]

For policy to make sense we must have real alternative possibilities before us and a criterion for choosing among them. Position (4), neodarwinism, fails on both counts – choice is an illusion and even if we had real options we have no criterion for choosing among them. Natural selection does it for us, even though it may, for presumed survival reasons, delude us with the illusion of choice. Position (3), providential determinism, tells us that objective value exists and we are tied to it by providence. Fortunately for us we have no freedom because if we did we would likely choose wrongly. Position (2), criterionless choice, extols our existential freedom and the reality of alternatives, but denies that we have any criterion by which to choose one thing over another except arbitrary individual preferences. Position (1) affirms both the reality of our options, and the objectivity of the criterion by which we should choose among them. Only in (1) do we have both the real alternatives and the objective criterion required for responsible rational choice – for policy to make sense. It follows therefore that people engaged in policy, yet holding to positions (2), (3), or (4) are in the grip of a severe and debilitating inconsistency.

Real options and objective value (1) constitute the Judeo-Christian religious premises upon which most of our laws and customs depend. They are the foundation of past legislation and our current laws as well as the rationale for any future policy. Yet many intellectuals[5] today reject the traditional position (1) in favor of Neodarwinism (4). Do they, as consistent criterionless determinists, forgo all advocacy of policy? Most do not. How then do they resolve the logical contradictions of their position? They do not! Witness Wendell Berry's[6] legitimate consternation at the insouciant self-contradiction he found in Edward O. Wilson's book, *Consilience*:

> *A theoretical materialism as strictly principled as Mr. Wilson's is inescapably deterministic. We and our works and acts, he holds, are determined by our genes, which are determined by the laws of biology, which are determined ultimately by the laws of physics. He sees that this directly contradicts the idea of free will, which even as a scientist he seems unwilling to give up, and which as a conservationist he cannot afford to give up. He deals with this dilemma oddly and inconsistently.*
>
> *First, he says that we have, and need, "the illusion of free will'" which, he says further, is "biologically adaptive." I have read his sentences several times, hoping to find that I have misunderstood them, but I am afraid that I understand them. He is saying that there is an evolutionary advantage in illusion. The proposition that our ancestors survived because they were foolish enough to believe an illusion is certainly optimistic, but it does not seem very probable. And what are we to think of a materialism that can be used to validate an illusion? Mr. Wilson nevertheless insists upon his point; in another*

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> *place he speaks of "self-deception" as granting to our species the "adaptive edge."*
>
> *Later, in discussing the need for conservation, Mr. Wilson affirms the Enlightenment belief that we can "choose wisely." How a wise choice can be made on the basis of an illusory freedom of the will is impossible to conceive, and Mr. Wilson wisely chooses not to try to conceive it." (p. 26)*

Instead of dealing with contradiction some scientists levitate above it and *ex cathedra* denounce their critics as fundamentalist religious nuts. This is not to deny the existence of real fundamentalist religious nuts, but even if all these nuts disappeared the problem stated here would remain. The real conflict between traditional religions and neodarwinism is that of criterionless determinism, not the evolutionary kinship of mankind with the rest of creation. Repeated replays of Wilberforce vs Huxley, and Darrow vs Bryan, however entertaining, do not meet the issue. People who assert (a) that choice is an illusion, and (b) that even if it were not illusory, the criteria by which one chooses are arbitrary – such people owe it to all concerned to remain silent about policy. In fact their participation in policy dialogue should be subject to "estoppel" – legal injunction to restrain a witness from contradicting his own testimony.[7]

Although the contrast is most stark between the neodarwinists and traditional religion, the providential determinists and the criterionless choosers should also keep silent about policy. So a word about each is in order.

Providential determinism is partially rooted in the doctrine of predestination. We hear little about theological predestination today, but the idea that forces bigger than ourselves control our lives is very much with us. The faith that the inevitable advance of science, economic growth, and globalization will save us in spite of ourselves is alive and well. Technology can be trusted because it is an instrument of providence. Nobel laureate chemist R.A. Millikan[8] disagreed with the warnings about the danger of nuclear energy given by fellow Nobel chemist Frederick Soddy, and told his readers that they could *"...sleep in peace with the consciousness that the Creator has put some foolproof elements into his handiwork, and that man is powerless to do it any titanic physical damage."* Providence has placed toddling mankind in a playpen full of soft and colorful things that have no sharp edges or poisons, and that are tolerant of our technological probings. The dangerous choices have already been made for us by a wiser power and we can concentrate on safely developing our motor skills and technical inventions. Yes, we may bump our heads now and then, but we need not worry about what Millikan called "hobgoblins and bugaboos that crowd in on the mind of ignorance" – such as fears about atomic energy. In hindsight it is easy to see that Soddy was the true prophet and that Millikan was whistling in the dark. But Millikan's trust in the providential goodness and irresistible power of technology, as well as his Gnostic faith in knowledge itself, is still with us. Millikan too should have remained silent, not just because he turned out to be wrong, but because there was never a real issue for him – just a hobgoblin which would disappear in the providential daylight of scientific progress.

"The faith that the inevitable advance of science, economic growth, and globalization will save us in spite of ourselves is alive and well."

Criterionless choice is thought by existentialists to be a heroic stance. Witness the famous concluding statement by biologist Jacques Monod, (*Chance and Necessity*, 1972):

> *The ancient covenant is in pieces; man knows at last that he is alone in the universe's unfeeling immensity, out of which he emerged only by chance. His destiny is nowhere spelled out, nor is his duty. The kingdom above or the darkness below: it is for him*

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to choose.

Unfeeling chance, no destiny, no duty – but man must choose. Choose what? The "kingdom above or the darkness below" we are told. But where did such value-laden language come from? It sounds suspiciously like the ancient covenant which Monod has just told us is in pieces. It certainly does not fit the context of random unfeeling immensity. But neither does it fit the neodarwinist denial of both real options and an objective criterion of value by which to choose. Monod, in spite of his neodarwinist views, affirms freedom to choose. But criterionless choice is a rather meaningless choice, like flipping a coin, which at least is consistent with our presumed random origin. Existentialists, however much they seem to enjoy the personal angst of criterionless choice, are ill-equipped to make public policy. They too owe it to the rest of us to remain silent in public policy debates.

To summarize: the argument has been made that the Judeo-Christian belief in both objective value and real alternatives is a necessary condition for public policy to make any sense, as well as necessary for the virtue of tolerance. Additional indirect support for this position has been adduced by looking at the modern alternatives to it and pointing out their logical incoherence.

Whitehead's 'Lurking Inconsistency'

If this is a correct view of the situation then it should not be so surprising that our current public policies are feeble, halfhearted, and ineffective. Policy thought is enfeebled by what Alfred North Whitehead called the "lurking inconsistency". An example is provided by one of our leading political scientists, L. K. Caldwell, a pioneer in environmental policy. Caldwell asks in the title of a recent address, "Is Humanity Destined to Self-Destruct?"[9]

I'd like to consider a shorter question, "Is Humanity Destined?" To be destined means to be "determined beforehand, preordained to an inevitable outcome." Whether the inevitable outcome is ecological destruction or salvation is a further question that arouses our curiosity, but, as long as either outcome is our destiny, no policy recommendations would be called for. Does Caldwel! believe that humanity is destined, and is he merely curious about which outcome is preordained? He seems to me ambivalent – but let him speak for himself:

> *At our present state of knowledge, it still seems rational, with some reservations, to believe that social choice is possible. But we do not know the extent to which meaningful choice is really possible. Human society may be driven by innate forces that, in effect, determine our destiny. Choice may be an illusion. The fate of Homo sapiens may be destined by evolutionary 'necessity' overriding all hypothetical rational choice. But until forced by evidence to this conclusion , it seems reasonable to assume that humans possess or may acquire the capacities to make the choices necessary to a sustainable future.*

Elsewhere in the article Caldwell uses the conditional phrases, "If choice rather than necessity is an option available to humanity...," and, "To the extent that humans choose their future..." Such usage indicates that for Caldwell the idea that "Choice may be an illusion" is a very real possibility. Yet he does offer some policy proposals, which would be a silly thing to do if he really believed that choice is an illusion. From this and the last sentence quoted above, I will take it that his ambivalence is biased toward the view that humanity is not destined, and will confine myself to some thoughts about the consequences of a half-hearted belief that choice might be real. I believe this ambivalence is characteristic not just of Caldwell, but of most of us. Caldwell just expressed more clearly and honestly what is in the minds of many.

Caldwell, and most of the modern intelligentsia, halfway believe that Monod's nihilism is justified (Caldwell quoted the famous statement from Monod just discussed). But they want a bit more proof. So they say, let us assume that choice and purpose are real and act on them until the evidence proves us wrong. Only then will we give up on purpose

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and policy, and devote ourselves to simply analyzing and describing the inevitable process of self-destruction. But I wonder what "evidence" could possibly mean in a world in which choice were truly an illusion? If choice is an illusion then is not the idea of choosing according to evidence also an illusion? If evidence guides one's choice to conclude that choice an illusion, then has one not contradicted one's conclusion in the process of reaching it?

Such incoherence is an outcome of Whitehead's "lurking inconsistency," a contradiction among the most basic premises of the modern worldview. As Whitehead put it :

> *A scientific realism, based on mechanism, is conjoined with an unwavering belief in the world of men and of the higher animals as being composed of self-determining organisms. This radical inconsistency at the basis of modern thought accounts for much that is half-hearted and wavering in our civilization... It enfeebles [thought], by reason of the inconsistency lurking in the background... For instance, the enterprises produced by the individualistic energy of the European peoples presuppose physical actions directed to final causes. But the science which is employed in their development is based on a philosophy which asserts that physical causation is supreme, and which disjoins the physical cause from the final end. It is not popular to dwell on the absolute contradiction here involved.* (*Science and the Modern World*, 1925, p. 76, Free Press, New York.)

In other words, our scientific understanding of nature is based on mechanism and efficient causation, with no room for teleology or final causation. Yet we ourselves, and higher animals in general, directly experience purpose, and within limits, act in a self-determining manner. We respond to the persuasive lure of final causes (purposes), as well as to the push and pull of mechanical, efficient causes. If we are part of nature then so is purpose; if purpose is not part of nature then neither, in large part, are we.

The purposeful nature of environmental policy is in total contradiction with the purposeless nature of biological science, at least the current neodarwinian orthodoxy. Biology is unable to embrace purpose and cannot be relied on by itself to conserve the biosphere, since that is surely a purpose. So conservation must be asserted as a purpose that comes from elsewhere, even if it makes use of biological science as a means. The problem comes in the word "elsewhere," because neodarwinists do not accept "elsewhere," insisting that all is nature, nature is mechanism, and that what we call purpose is an illusion. This belief, even if it is only half believed, lurking as a possibility in the back of the mind of those who may not explicitly affirm mechanism, is nevertheless logically, emotionally, and politically enfeebling. Just as Whitehead recognized, the lurking inconsistency enfeebles thought and action by leading us to consider our direct conscious experience of purpose and choice as somehow less real than an abstract theory of mechanistic determinism that denies our concrete experience – the "fallacy of misplaced concreteness."

As noted, purpose or final cause must, in the view of mechanism, be an "epiphenomenon" – an illusion which itself was selected because of a presumed reproductive advantage that it chanced to confer on those under its influence. It is odd that the illusion of purpose should be thought to confer a selective advantage while purpose itself is held to be non causative. First we are asked to believe that our ancestors survived thanks to actions based on the illusion of purpose. Second we are told that purpose itself is non causative. What then, are we to believe that only illusory purposes are causative and adaptive? And is it not a contradiction that materialism should depend so heavily and selectively on illusions? The policy implication of the mechanistic dogma that purpose is not causative is *laissez faire* beyond the most libertarian economist's wildest model. The only "policy" consistent with this view is, "let it happen as it will anyway."

Teleology has its limits, of

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course, and from the Enlightenment onward it is evident that mechanism has constituted an enormously successful research paradigm for science in general, including biology. Although mechanism has lost its hold on physics, it remains dominant in biology. The temptation to elevate a successful research paradigm to the level of a complete world view is perhaps irresistible. But mechanism too has its limits. To deny (or even to doubt) the reality of our most immediate and universal experience (that of purpose) because it doesn't fit the research paradigm is radically anti-empirical. To refuse to recognize the socially devastating logical consequences that result from the denial of purpose is profoundly anti-rational. Yet environmentally-minded economists and political scientists take their cues from biologists and ecologists who, as adherents to the standard neodarwinist world view, are heirs to its blindnesses as well as its insights.

Fortunately the personal behavior of biologists often transcends the philosophical foundations of their science, and they advocate policies to conserve biodiversity. Naturally the public asks the biologists what purpose would be served by saving an obscure threatened species at the cost of other species, or at the cost of inconvenience to human beings? Since most leading biologists claim not to believe in purposes, ends, or final causes, this is not an easy question for them to answer. They reveal the inconsistency that Whitehead saw lurking in the background by the feeble fecklessness and wavering halfheartedness of their answers. They tell us about biodiversity, and ecosystem stability and resilience, and about a presumed instinct of biophilia that we, who systematically drive other species to extinction, are nevertheless supposed to have encoded in our genes. But the biologists are too half-hearted to affirm any of these descriptive concepts as an abiding purpose, and thereby question the fundamental assumption of neodarwinism. For example, biophilia could be appealed to as a virtue, a persuasive value rather than a wishfully imagined part of the deterministic genetic code. But that would be to admit purpose. Instead the neodarwinists try to find some overlooked mechanistic cause that will make us do what we think we ought to do, but can't logically advocate without thereby acknowledging the reality of purpose.

Absent purpose, the biologists' appeals to the public are both logically and emotionally feeble. Is it too much to ask the neodarwinist to speculate about the possibility that the survival value of neodarwinism itself has become negative for the species that really believes it? Could this be a lethal consequence of the lurking inconsistency? By undermining the very belief in purpose the lurking inconsistency fosters a world in which choice becomes, if not an illusion, certainly a neglected possibility.

The economic determinism of Marx has now collapsed both intellectually and politically. The psycho/sexual determinism of Freud is increasingly considered pseudo science of the worst kind. The remaining member of the nineteenth century trinity of determinism, Darwin, is still riding high. However, the neodarwinist evolutionary determinism of chance and necessity with its total rejection of purpose and design, is undergoing serious reconsideration in many quarters, even though somewhat underground.[11]

As I write this, the news media are full of the story of Kansas having rejected the teaching of evolution in public schools. I hope it is clear that one may point to problems with neodarwinism without in the least advocating the excision of evolution from school curricula. By all means teach it, both its strengths and weaknesses. But can we please include a reference to Whitehead's lurking inconsistency as well? Seventy-five years later Whitehead's observation remains true: *It is not popular to dwell on the absolute contradiction here involved..*" We pay a price for suppressing contradictions, however unpopular they may be. That price, in this instance, is feebleness of purpose and halfheartedness of policy – at a time when clarity of purpose and strength of commitment are critical. ■

[*Editor's note: In the interest of saving space the footnotes are not printed here but are available on request at 1-800-352-4843.*]

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Energy is Fundamental

More Americans means more energy use, more environmental impact

by Leon Kolankiewicz

For Americans then living, the all-but-forgotten "energy crisis" of the mid and late-1970's was like a patch of rough water disrupting the smooth sailing of the American Dream. Our exuberant post-World War II expectations of a "bigger is better" consumer's paradise – an ever-growing population enjoying ever-increasing material plenty, bigger gas-guzzling cars, more luxurious homes on larger suburban spreads, more energy-devouring gadgets, gimmicks and gewgaws – had come to seem a national birthright.

Then suddenly, that dream was threatened by sinister outside forces. Far away in the Middle Eastern deserts, strangely-clad people who'd ridden about on camels only a generation before abruptly turned off the oil spigot...and pierced our bubble of blissful ignorance. Complacent, comfortable Americans were outraged when the price of gasoline at the pump quadrupled overnight and they had to wait in long lines at filling stations and put locks on their gas tanks to prevent thieves from siphoning it out. We realized reluctantly that while our inventiveness may have been the brains behind industrialized civilization, crude oil was its lifeblood.

But almost as suddenly as it burst upon us, the energy crisis faded, fuel prices dropped again into the comfort zone, and Americans went back to sleep. Popular and political concern over energy policy fizzled faster than a seabird in an oil slick. Like disco music, advertisements that featured gas mileage ratings for new cars went out of style. By the nineties, the ultimate consumer nation indulged its bottomless appetite for new products by gorging on minivans, sport utility vehicles (SUV's), and enormous pick-up trucks that grew ever more like tractor-trailers in size and power. Not surprisingly, improvements in the national auto fleet's average fuel efficiency stalled and then slid backwards. The number of personal computers, large-screen TV's, Internet connections, and other electricity-using devices exploded, and with it, the demand for new power stations and transmission lines.

> Except for electricity, the lion's share of growth in US energy consumption...is related to growth in the sheer number of energy consumers, that is, US population growth. In the 1990s alone, the US population grew by 33 million, more than in any single decade in the country's history.

But however unfashionable or passé concern over energy policy may have become, the underlying importance of energy itself to our way of life never diminished. Energy didn't cease to pervade every aspect of our existence merely because we chose to ignore it again.

Indeed, energy is fundamental to ecosystems as well as economies. Solar energy activates virtually all life, both terrestrial and aquatic, at the earth's surface; it energizes the biosphere, that thin film of living organisms and their inorganic medium that envelops the planet. Hundreds of millions of years ago, green plants evolved the ability to tap into this reliable source of energy through the complex biochemical process called photosynthesis. Without green plants, or "producers" as ecologists call them, to harvest the energy of the sun, quite simply there would be no cows, whales, humans or any other animal. To economists, people are producers as well as consumers, but to ecologists, *Homo sapiens* and every other animal are only consumers.

Leon Kolankiewicz *is an environmental planner and co-author, with Roy Beck, of* Forsaking Fundamentals: The Environmental Establishment Abandons US Population Stabilization *published by the Center for Immigration Studies, Paper No. 18, March 2001.*

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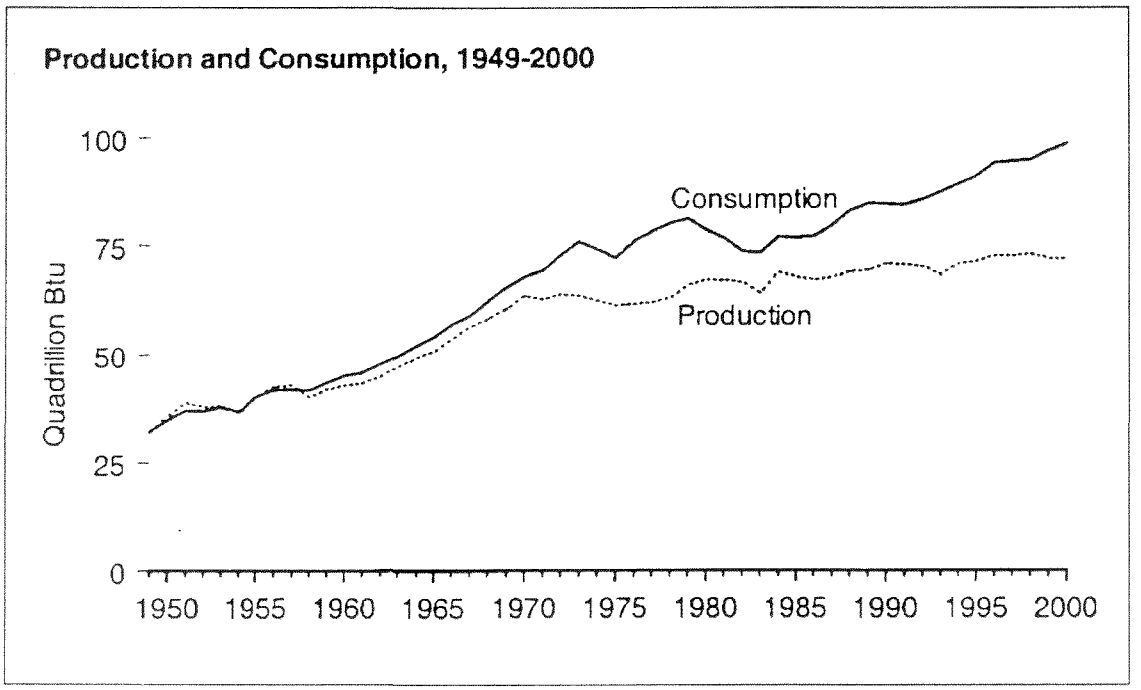

Figure 1 – U.S. Energy Production and Consumption, 1949-2000
Source: Energy Information Administration. 2001. Annual Energy Review 2000. Figure 1.3

The human economy is equally dependent on energy. This should not be surprising, since the human economy is but a subset, albeit an ever-larger one, of the biosphere, or "nature's economy." From the time of ancient hunter-gatherer societies to today's complex Information Age, humans have always depended on solar energy for all the food we eat and for many other resources that furnish indispensable commodities.

U.S. Energy Primer

In the United States, total energy consumption more than tripled over the past half-century, jumping from 32 quadrillion Btu's (32 quads) in 1949 to 99 quads in 2000. The lion's share of our energy comes from the fossil fuels – oil, natural gas and coal – and fossil fuel consumption nearly tripled over the same period, from 29 to 84 quads.[1] In 2000, of the primary energy derived by combusting fossil fuels in the United States, 45% was from petroleum, 28% from natural gas, and 27% was from coal. Figure 1 depicts rising consumption and production of overall energy in the United States from 1949 to 2000. It shows that today, domestic energy production is falling behind consumption, primarily because of the inability of declining domestic petroleum production to meet increasing domestic petroleum consumption. (The gap is made up by rising oil imports, which now account for over half of U.S. petroleum consumption.)

In the late 1950's a promising new source of energy was exploited commercially for the first time – nuclear power. For the first couple of decades after being brought on-line, controlled fission of uranium to boil water and generate electricity was widely heralded as the clean, cheap future of electric power. But construction and maintenance costs began to skyrocket in response to unresolved safety and environmental issues. At the same time, nagging questions about waste disposal and nuclear proliferation arose and would not go away. Then came two infamous accidents: Three Mile Island near Harrisburg, Pennsylvania in 1979 and Chernobyl in the Ukrainian Republic of the USSR in 1986. Both of these, particularly the latter reactor core meltdown, badly shook public confidence in the operational safety of nuclear power plants. Of the two, Chernobyl was by far the worse in terms of actual casualties. As a result of all its technical, economic, environmental and political setbacks, in recent years the growth of nuclear-generated electricity in the United Sates has

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slowed considerably.

As a result of Middle Eastern political turmoil in 1973-74 and 1979-80 driving up the price of crude oil, Americans undertook a long-overdue national discussion on energy policy – how best to meet our energy needs in a way that was affordable both economically and environmentally. They also contrived clever ways of conserving energy and using it more efficiently. One consequence of these efforts was a reduction in demand for energy in the United States, and in particular for imported petroleum. Even as the economy grew, total U.S. energy consumption actually *fell* from 76 quads in 1973 to 73 quads in 1983, while consumption of imported oil dropped from 13.5 to 10.7 quads over the same period.[2] Annual energy consumption per capita declined from 359 million Btu in 1973 to 314 million Btu in 1983. As the law of supply and demand would predict, this helped bring about a drop in the price of petroleum. At the same time, the higher oil prices in the 1970's spurred greater exploration and production of crude oil. These factors combined to cause a temporary "oil glut" and a precipitous decline in the price of crude oil in the 1980's. Oil prices, both by the barrel and at the pump, have remained relatively low from the eighties to the present, as measured in constant dollars.

Unfortunately, the baby was thrown out with the bath water. While lower energy prices may be better for American consumers and the economy in general, at least in the short term, they also undermine the timely pursuit of long-term alternatives to oil in the inevitable post-petroleum era. More recently, even growing scientific evidence on the contribution of burning fossil fuels to climate change (global warming) has not been enough to convince American consumers, politicians and businesses to look at energy policy holistically and with a long-term perspective. Nor to recognize that over the long haul, energy conservation and efficiency are not merely commendable but ineffectual expressions of private virtue (as expressed by Vice-President Dick Cheney early in 2001 when he headed up the Bush administration's energy policy task force), but rather the cornerstone of any viable, *sustainable* energy strategy.

While eminent petroleum geologists like Colin Campbell, Walter Youngquist, Richard Duncan, L.F. Ivanhoe, Craig Bond Hatfield, and Kenneth Deffeyes continue to warn that global petroleum production will likely peak in the first decade or two of the 21st century, American consumers continue to splurge as if there were no tomorrow. As long as gas is cheap today, they would prefer to abandon carpooling and mass transit and indulge their fancies for gas-guzzling SUV's, minivans, and pickup trucks rather than conserve oil and the climate for tomorrow.

Unlike oil, the lion's share of natural gas and coal consumed in the U.S. comes from domestic production, as a result of the difficulties and costs inherent in the transport of these two fossil fuels over very long, i.e. transoceanic, distances. Domestic natural gas production expanded from 5.4 quads in 1949 to 19.7 quads in 2000, a nearly 4-fold increase, while coal production rose from 12 to 23 quads over the same period, a near-doubling. The United States has vast coal resources but a much more constrained supply of natural gas.

The major renewable energy sources include hydroelectric, solar, wind, geothermal, and biomass. Hydro, wind and geothermal are used primarily to generate electricity, while solar and biomass are exploited both for electricity and space heating. Unfortunately, higher prices, limited, intermittent, or diffuse supply, institutional and financial barriers, and (especially in the case of hydroelectricity) environmental constraints, have slowed the penetration of renewables into the marketplace. In the year 2000, all renewables combined accounted for just 9% of total energy produced in the U.S., of which three-quarters or more was conventional hydroelectric power, maligned by environmentalists for its devastating impacts on rivers and salmon.

Energy and the Environment

Producing and consuming energy has myriad, profound implications for the environment. Each energy source generates environmental impacts, but these vary widely in kind and intensity.

Petroleum

Environmental impacts of varying types and degrees occur from virtually all phases of exploiting petroleum resources, including exploration, extraction, transport of crude oil, refining, transport of petroleum products, and ultimate consumption.

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Environmental impacts of producing and using oil include:

- short-term and long-term disruption of wilderness and isolated indigenous cultures during frontier exploration and extraction;
- oil spills from tankers and pipelines while transporting crude oil and refined products;
- air, water and toxic pollution from oil refineries and petrochemical plants;
- emissions of carbon dioxide (CO_2), carbon monoxide (CO), VOC's or hydrocarbons, and nitrogen oxides (NO_x) at the point of combustion.

In the presence of sunlight, VOC's and nitrogen oxides react to form ozone, a key ingredient of smog. Carbon dioxide is the leading "greenhouse gas," implicated in global climate change and global warming. NO_x emissions contribute not only to smog, but to acid rain and to the degradation of water bodies like the Chesapeake Bay, where it serves as a nutrient contributing to noxious algal blooms.

Natural gas

Natural gas is the cleanest-burning of the fossil fuels, emitting fewer conventional or "criteria" pollutants per Btu delivered as well as less CO_2 than either oil or coal. However, natural gas exploration and production entail many of the same impacts on natural or rural habitats as oil drilling, including the potential for a degree of water pollution, habitat fragmentation (from seismic surveys, road building, and well pad construction), soil erosion, and impacts on scenery.[3] Nonetheless, at both the point of extraction and the point of consumption, natural gas is clearly the least environmentally damaging of the fossil fuels.

Coal

If natural gas is the cleanest of the fossil fuels, coal is clearly the dirtiest, both in the production and consumption phases of its exploitation. Thus, it is decidedly a mixed blessing that the U.S. has far more reserves of coal than oil or gas. While there have undoubtedly been many safety and health improvements in recent decades, underground coal mines have traditionally been dangerous and unhealthy workplaces. For example, an estimated 4.5% of miners are afflicted with black lung disease, and over 14,000 deaths in the USA from 1979-1996 were attributable to it.[4]

Mining and burning coal causes a plethora of environmental problems:

- acid mine drainage, which can damage aquatic ecosystems, much as acid rain does, by reducing the pH to intolerable levels for fish and aquatic invertebrates;
- surface or "strip" mines and "mountaintop removal" for coal have disfigured countless landscapes in Appalachia, especially in eastern Kentucky and West Virginia;
- coal-burning power plants are the largest source of sulfur dioxide (SO_2) emissions, which are related to two grave environmental problems: acid rain (more properly known as acid precipitation or deposition), and reduction of visibility across various areas of the country. The first has impaired freshwater fisheries in parts of the country (especially the Northeast), while the second has tarnished landscape vistas, especially in the East.
- power plants burning coal are also a major source of mercury contamination;[5] mercury accumulates in the food chain, to levels that can be harmful to birds and people who eat fish;
- coal emits more carbon dioxide per Btu than either oil or natural gas;

There is a broad consensus among climatologists that the earth's atmosphere is gradually warming and that anthropogenic emissions of the so-called greenhouse gases, principally carbon dioxide (CO_2) and methane (CH_4), are responsible.[6] In a 2001 report, the National Research Council concluded that the "warming process has intensified in the past 20 years, accompanied by retreating glaciers, thinning arctic ice, rising sea levels, lengthening of the growing season in many areas, and earlier arrival of migratory birds."[7] Congress ordered a preliminary national assessment of climate change's ecological effects, which issued draft findings in June 2000.[8] Among the predicted changes are "potentially severe droughts, increased risk of flood, mass migrations of species, substantial shifts in

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agriculture and widespread erosion of coastal zones... many long-suffering ecosystems, such as alpine meadows, coral reefs, coastal wetlands and Alaskan permafrost, will likely deteriorate further. Some may disappear altogether."[9]

Oil Shale, Oilsands and Tarsands

Known resources of these low-grade fossil fuels are massive but their utilization is problematic. For instance, when the energy costs of mining, transporting, refining and waste disposal are tallied up, the *net* amount of energy recovered from oil shale, oilsands and tarsands is likely to be small. This increases the quantity that must be mined and processed for each unit of net energy obtained, which in turn increases the land surface area that must be disturbed. Mining and processing oil shale is water-intensive, in an inherently water-scarce region – the American Southwest. Finally, utilizing these fuels on a large scale would simply generate many of the same pollution problems as petroleum and coal, including emissions of VOC's, nitrogen oxides, and carbon dioxide.

Hydroelectricity

Hydropower furnishes about eight percent of the nation's electricity generation by electric utilities.[10] Its two environmental advantages are that it is "clean" – it does not release carbon dioxide, sulfur dioxide, particulates, or mercury to the air – and somewhat renewable. It is "somewhat" renewable rather than entirely renewable because over a period ranging from decades to centuries, hydroelectric reservoirs (as in the case of all reservoirs) inevitably fill in with sediments, reducing the water storage capacity, and therefore the potential energy and generation capacity of the facility.

Another advantage of hydropower is that to some extent, it can be combined with facilities that also provide for flood control, navigation, water supply, and lake-based recreation (fishing, boating, water-skiing, swimming, etc.).[11]

Hydroelectricity's disadvantages are many, severe and well-documented:[12]

- permanent flooding of fertile floodplains and their forests or rich farmland;
- permanent loss of sometimes spectacular landscapes, such as those that disappeared at Hetch Hetchy Valley in Yosemite National Park and at Glen Canyon on the Colorado River;
- displacement of residents;
- flooding of archaeological resources;
- modification of hydrology and disruption of sediment transport (which can starve downstream beaches and estuaries of needed sand and silt);
- alteration of aquatic life and near-elimination of certain migratory species, like salmon;

The reality facing hydroelectricity is that, outside of Alaska, very few untapped damsites with large hydroelectric potential can be developed, because many of the best sites have already been exploited, and the political opposition to damming remaining free-flowing segments of rivers would be intense.

Nuclear fission

The beleaguered nuclear power industry is mired in a morass of economic, political and environment problems that have slowed the domestic advance of this once-promising energy form to a crawl. Still, in 2000 nuclear supplied 23% of the electricity generated by the nation's electric utilities.[13]

The environmental advantages of nuclear power are well worth noting: it produces no conventional air pollutants like SO_2 and particulates, it does not require the permanent flooding of productive or scenic valleys, and it releases no CO_2, the main greenhouse gas. Moreover, uranium mines are not as cruel to the landscape as coal mines. These are important advantages, frequently touted by nuclear power's supporters to a skeptical public and anti-nuclear activists that all too often tends to see it as an environmental villain.

Against these pluses must be weighed a number of disadvantages:

- Underground uranium mines have affected the health of miners, many of them Native Americans in the Southwest;[14] toxic tailings piles have not received adequate treatment;
- Uranium supplies are not unlimited and therefore nuclear fission is not sustainable;. breeder reactors, which to some extent

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circumvent limits to uranium resources, would commit the world to a "plutonium economy," which would be most unfortunate, given plutonium's deadly toxicity and long radioactive half-life; implications for nuclear proliferation, terrorism and poisoning of the environment would all be horrendous;

- Nuclear reactor operational safety and possible vulnerability to terrorist attack;
- Permanent disposal of highly long-lived, toxic and radioactive nuclear waste.

Nuclear power's problems are partly technical and partly political, and its future is clouded.

Wind Energy

Windmill technology has advanced by leaps and bounds in the last thirty years. This technical progress has led to a marked decline in generating costs, making wind energy competitive with conventional sources of electricity generation. The two major technical disadvantages of wind are that it is intermittent (not constant) and dispersed (not concentrated), so that it takes a large land area to generate a given amount of electrical energy. However, as with hydroelectric reservoirs providing multiple benefits (i.e. recreation, water supply, flood control), areas with windmills can still continue to provide for certain other land uses, such as grazing. The first problem, wind's variability, can perhaps be overcome by various means of energy storage, like hydrogen, now under research and development.

Pilot projects and the limited commercial development to date have brought to light three principal environmental problems associated with wind: noise, visual impacts, and bird kills:

- Noise – In some instances, very large, high windmills (upwards up 150-200 feet tall) with long blades have triggered complaints from nearby residents about noise. This problem can be mitigated by siting wind machines at least one kilometer from residential areas; in addition, newer designs may reduce turbine generator noise.[15]
- Visual impacts – The best sites for windmills are those that are most exposed to the wind, which include ridges, mountains, mountain passes, and seacoasts. These landscapes are often cherished for their scenic beauty, which can be impaired by incongruous visual elements. Aesthetic concerns have fueled to opposition to certain windmill proposals by environmentalists themselves. Other sites with large wind potential, such as the flat, less scenic Northern Great Plains, are far less likely to encounter opposition.
- Bird kills – Turning windmill blades have been documented to kill birds, especially migrating or soaring raptors, that is, birds of prey like hawks and eagles.[16] The extent of this problem, and how to mitigate it, have yet to be determined, but research is ongoing. But this disadvantage of wind power has already stifled its development in some places.

Wind energy, while clean and renewable, is not entirely "green." It can be an important partial solution to our energy supply dilemma, but it is not a panacea with unlimited prospects for expansion.

Biomass

Biomass includes everything from burning firewood in residential woodstoves, to the use of hog fuel or woodwaste in sawmills to generate process heat or electricity, to the conversion of crops such as corn or sugar cane into ethanol or methanol. One of the serious long-term issues confronting biomass is whether some of the products actually generate any net energy for society. For example, the energy expended to produce one liter of ethanol from corn with an energy content of 5,130 kilocalories (kcal) is 10,200 kcal – a net energy loss.[17]

Where biomass is a byproduct of some activity, or when crops, such as trees, can be harvested in a truly sustainable manner, then biomass may make environmental sense. But this also establishes a fairly restrictive limit. Harvesting crop residues as a fuel can expose agricultural soils to wind and water erosion, as well as remove organic materials that add soil structure and essential nutrients from the land that must be replaced by fossil fuel-based fertilizers. Biomass energy can also compete with other critical land uses for high-quality land and soils. Generally, the combustion of biomass generates more air pollutants than gas, but less than coal.

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In sum, while biomass does play an important role in today's and tomorrow's energy mix, its potential to expand is severely constrained.

Solar Energy

Solar energy comes in many different forms. Centralized forms include solar thermal electricity-generating and photovoltaic (PV) plants, which can produce electricity for the electric grid. Decentralized technologies include passive solar space heating, solar hot water heaters, and photovoltaic panels for rooftops and dispersed applications (road signs, telephones, etc.) Solar energy will last as long as the sun does, has little or no emissions of greenhouse gases, sulfur dioxide, nitrogen oxides, volatile organic compounds (hydrocarbons); it does not generate significant quantities of solid waste or water pollutants. On the other hand, solar thermal plants use fairly large amounts of water.[18]

Solar is about as "green" as it gets, but as with wind energy, it is no environmental panacea. The main reason is that solar energy is relatively diffuse or dispersed compared to other energy sources, particularly the fossil fuels and nuclear energy. It is estimated that five acres of land are needed for each megawatt of capacity,[19] or about 5,000 acres (almost eight square miles) for a typical 1,000-megawatt power plant. This means it takes large areas to capture a given amount of solar energy. If U.S. energy supply were to be met entirely by solar energy, a sizeable percentage of the country's land area would have to be expropriated for this purpose. One estimate thrown around over the years is 10% or so. On the other hand, another estimate is that only 60,000 square kilometers, or about 20%of Arizona would need to be covered by photovoltaic cells to meet the USA's entire electricity demand.[20]

This is still an enormous amount of land. Unlike wind turbines, the solar panels of a centralized generation facility completely alter its ecology and appearance every bit as much as a hydroelectric dam and reservoir modify a river. The native flora and fauna of the site, if not completely displaced, are radically changed and biodiversity reduced or eliminated. If America's Southwestern deserts were to be sacrificed wholesale to solar energy production, it would not take long before at least some conservationists would begin to oppose the conversion of vast areas of wild desert landscapes and ecosystems to energy factories as passionately as they oppose any new dams now.

Geothermal Energy

Geothermal energy is derived from heat contained in certain geologic formations beneath the ground surface within the earth's crust. In comparison with other energy sources, geothermal energy has some significant environmental benefits: greenhouse gas emissions are virtually nil; sulfur dioxide emissions are negligible; and geothermal facilities demand relatively little land surface area. Within their footprint, they resemble most light industrial facilities.[21]

Environmental concerns raised by geothermal energy include air and water pollution, the safe disposal of hazardous waste, siting, land subsidence, and potential adverse effects on rare hydrogeological formations, like geysers and hot springs.[22] As with several other energy sources, one drawback of geothermal energy is that many hydrothermal reservoirs are located in or near outstanding natural areas like Yellowstone National Park and the Cascade Mountains. Proposed developments in such areas have been intensely opposed by environmentalists and wilderness advocates.[23] Thus, the potential for substantial future expansion of this energy resource is uncertain.

The Role of Population Growth

How much of our rising energy demand is due to: 1) increasing per capita consumption, and how much is explained instead by, 2) an increase in the number of energy consumers, that is, population growth?

Using a straightforward mathematical method described in a 1991 paper, it is possible to show what percentage of the growth is associated with increasing per capita consumption and what percentage is related to increasing population.[24]

A society's aggregate energy consumption at any given time or period of time can be expressed as follows:

$$E = P \times e$$

where 'E' equals total energy use, 'P' equals population size and 'e' equals per capita energy use.

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Over a given period of time then, the share of growth in energy consumption related to population growth is obtained by the following equation:

Population's share of growth =

Ln ((ΔP + P)/P) / Ln ((ΔE + E)/E)

Using this equation, we can examine the following energy-related trends:

1. increase in total U.S. energy consumption from 1970 to 2000;

2. increase in total U.S. electricity consumption from 1970 to 2000;

3.increase in total U.S. petroleum consumption from 1970 to 2000;

4. increase in total U.S. carbon emissions from 1990 to 1999.

Here are the raw data used in the analysis:

Table 1 – Recent Trends in Key Energy-Related Variables in the United States

Year	U.S. Population[1]	U.S. Total Energy Consumption[2]	U.S. Electricity Net Generation[3]	U.S. Petroleum Consumption[4]	U.S. Carbon Emissions[5]
1970	203,302,031	67.9	1,532	14.7	NA
1980	226,542,199	78.4	2,286	17.1	NA
1990	248,709,873	84.3	3,025	17.0	1,320
2000	281,421,906	98.5	3,792	19.5	1,490

[1] Source: U.S. Census Bureau, historical census data on the World Wide Web at http://www.census.gov/population/censusdata/table-2.pdf and http://www.census.gov/main/www/cen2000.html.

[2] In quadrillion BTUs (quads; Source: U.S. DOE, Energy Information Administration (EIA), Annual Energy Review 2000, Figure 1.1 and Table 1.1.

[3] In billion kilowatt-hours; Source: Annual Energy Review 2000, Figure 8.2 and Table 8.2.

[4] In million barrels per day; Source: Annual Energy Review 2000, Figure 5.1 and Table 5.1.

[5] From fossil fuel consumption (1999), in million metric tons of carbon; converted from carbon dioxide emissions in teragrams on p. 38 of *U.S. Climate Action Report 2002* (U.S. Department of State), released May 2002.

Table 2 presents the results of this analysis.

Table 2 – Shares of increases in Key Energy-related Consumption and Waste Generation Related to U.S. Population Growth

Decade	Total Energy Consumption	Electricity Net Generation	Petroleum Consumption	Carbon Emissions
1970-1980	75%	27%	2%	
1980-1990	129%	33%	NA*	
1990-2000	79%	55%	90%	103%
1970-2000	**87%**	**36%**	**115%**	

* Petroleum consumption declined from 1980-1990.

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Conclusion

POPULATION GROWTH RAISES ENERGY USE (AND ENVIRONMENTAL IMPACTS) MORE THAN RISING AFFLUENCE OR CHANGING TECHNOLOGY

United States population growth explains the preponderance of the increase in the nation's overall energy consumption, petroleum consumption and greenhouse gas emissions. Population growth is an important, but not the primary, factor in the country's rising electricity consumption.

Except for electricity, the lion's share of growth in U.S. energy consumption and related residuals or waste products (i.e. carbon dioxide, the primary greenhouse gas) is related *not* to increased affluence, rising disposable income, and technological advance. Rather, it is related to growth in the sheer number of energy consumers, that is, U.S. population growth. In the 1990's alone, the U.S. population grew by 33 million, more than any single decade in the country's history.

The relationship between population and economic growth, technological advance, energy use and environmental impacts is highly complex, chock-full of "nonlinearities," interdependent variables, feedbacks, and synergistic and cumulative effects that are glossed over by this basic analysis. Still, it is a good approximate gauge of population growth's key role in raising energy consumption.

To date, since below 10% of U.S. energy supply is renewable, population growth is pushing the country down an ever-more precarious, polluting path of dependency on fossil fuels. While it might be technically and economically feasible to transition toward more renewable, "greener" energy sources, none of these is cheap, unlimited, or entirely free of environmental problems. If the United States were entirely dependent on renewable energy sources, it would still not be able to support an ever-growing population indefinitely.

The U.S. Census Bureau projects more than 400 million Americans by 2050 and somewhere between half a billion and a billion by the year 2100. U.S. fertility rates have been at or below "replacement" levels for more than a generation, and thus birth rates are no longer the driving force behind our population growth, unlike the Baby Boom years from 1945 to 1064. Immigration levels, on the other hand, have quadrupled over the last four decades, and are now responsible for 60-70 percent of the nation's population growth. As the demographic momentum of sub-replacement level fertility continues to ebb, U.S. immigration policy will determine virtually all future population growth.

Unless Americans can muster the political will to return to more traditional immigration levels, then population growth will continue unabated for the foreseeable future, and with it growth in national energy consumption and intensifying impacts on the environment and natural resources. However, the "foreseeable future" is not forever, and ultimately, growth in both energy consumption and population will come to a halt. Whether this occurs in a more benign manner of our own choosing or a harsher manner if left to nature to impose upon us, still remains to be seen. ■

NOTES

1. Energy Information Administration (EIA). 2001. *Annual Energy Review 2000.* Table 1.3. U.S. Department of Energy.

2. EIA, 2001. Note 1. Table 1.1.

3. U.S. Forest Service. 2001. *Finger Lakes National Forest Oil and Gas Leasing, Draft Environmental Impact Statement.* U.S. Department of Agriculture. May.

4. American Lung Association. 2001. Fact Sheet: Occupational Lung Disease. Accessed 20 September 2001 on the World Wide Web at http://www.lungusa/diseases/occupational_factsheet.html.

5. National Center for Atmospheric Research. 2001. August 24 News release.

6. Joby Warrick, "Global Warming Is 'Real', Report Finds," *The Washington Post.* 13 January 2000. p.A4.

7. National Research Council, Committee on the Science of Climate Change. 2001. "Climate Change Science: An Analysis of Some Key Questions;" The National Academies News. 2001. "Leading Climate Scientists Advise White House on Global Warming." Press release. June 6. Accessed September 29, 2001 on the World Wide Web at www4/nationalacademies.org/news.nsf/isbn/0309075742?OpenDocument.

8. National Assessment Synthesis Team. 2000. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change.* Overview. US Global Change Research Program. New York: Cambridge University Press.

9. Curt Suplee, "Drastic Climate Changes: Global Warming Likely to Cause Droughts, Coastal Erosion," *The Washington Post*, 9 June 2000; also see Anon., "Report:

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Warming will reshape U.S.," MSNBC News, 9 June 2000. http://www.msnbc.com/msn/418229.asp.

10. EIA. 2001. Note 1. Figure 8.2.

11. U.S. Army Corps of Engineers. 2001. *Final Environmental Impact Statement: Title VI Land Transfer to the State of South Dakota,* Volume 1. Omaha District. November.

12. There is a vast popular and technical literature on these adverse impacts. See, for example, *The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources* by John V. Krutilla and Anthony C. Fisher (1975, Resources for the Future, Inc./Johns Hopkins University Press) for an economic study of the impacts of constructing a hydroelectric dam on Hells Canyon of the Snake River, a tributary of the Columbia.

13. EIA. 2001. Note 1.

14. Leon Kolankiewicz. 1988. "Activist protests planned mining." *New Mexico Daily Lobo*, September 7. p. 1.3.

15. David Pimentel, G. Rodrigeus, T. Wane. R. Abrams, K. Goldberg, H. Staecker, E. Ma, L. Brueckner, L. Trovato, C. Chow, U. Govindarajulu, and S. Boerke. 1994. "Renewable Energy: Economic and Environmental Issues." *Bioscience.* Vol. 44, No. 8, September.

16. National Wind Coordinating Committee. 1999. *Studying Wind Energy/Bird Interactions: A Guidance Document.* Washington, D.C. December.

17. See note 15, Pimentel et al.

18. Anon. 2000. Electricity from Solar Energy. Accessed on the World Wide Web on 27 May 2002 at http://www.powerscorecard.org/tech_detail.cfm?resource_id=9.

19. Ibid.

20. United States Environmental Protection Agency. 2001. "Environmental Benefits of Solar Energy." Accessed on the World Wide Web on 26 May 2002 at http://www.epa.gov/globalwarming/actions/cleanenergy/sol/factsheet.html.

21. U.S. Department of Energy. 1997. Environmental Impacts of Geothermal Energy. Accessed on the World Wide Web on 26 May 2002 at http://www.eia.doe.gov/cneaf/solar.renewables/renewable.enrgy.annual/appd.html. Appendix D in *Renewable Energy Annual 1996.* Released April 1997.

22. Michael Brower. 1992. Environmental Impacts of Renewable Energy Technologies. Accessed on the World Wide Web on 26 May 2002 at http://www.uscusa.org/energy/brief.renimpacts.html.

23. Ibid.

24. John P. Holdren. 1991. "Population and the Energy Problem." *Population and Environment*, Vol. 12, No. 3, Spring 1991.

* * *

Letter to the Editor

EDITOR:

Just checked in my garage and discovered two feet of *The Social Contract*, collected over the years. Most were in tatters from being over referenced. Thank you – thank you – thank you.

A word about two articles in the recent issue, Winter 2002-3:

As someone who has had historical data banging around in his noggin like ping pong balls, I devoured every word of "Ethnic Conflicts in History," as it renewed old friends that I never knew but fantasized about. Read it in one session and then kept referring back to it.

Dr. Madland put a subtitle on it, "An Ambitious Overview of Five Millenia." I agree. It was ambitious; too ambitious. Even for me it seemed to go on and on like a family argument. Toward the end I was doing the wiggle-worm dance and wondering what all this had to do with ethnic conflict. It was more about the diaspora of people and far too expansive for one paper.

The article recovered with "Where do we go from here?" with much to be remembered. Although having little to do with the rest of the article, it did provide a strong ending.

The second article worth lauding is a little gem by Brenda Walker, "Putting Stories Alongside the Numbers." This is something we all knew way down deep but never let surface. We never connected the dots. This will help my writing and, as an editor, one can have contributors start off with a little human interest introduction if appropriate.

Just wanted you to know how valuable your periodical is to me.

BOB SIMMONS
San Rafael, California

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Dual Citizenship Goes Global

by Edwin S. Rubenstein

Since the start of the Republic immigrants have been required to "renounce and abjure all allegiance and fidelity" to any foreign country before becoming a U.S. citizen. The renunciation oath was designed to ensure that people were loyal to the new America and were foreswearing allegiance to the British Crown.

For nearly 200 years the Federal government took the renunciation clause seriously. During the late 19th and early 20th centuries the U.S. ratified a series of treaties (the Bancroft Treaties, named after American diplomat George Bancroft). The intent of those treaties was to prevent dual citizenship by providing automatic loss of citizenship for Americans who obtained foreign citizenship as well as by foreigners who became citizens of the United States. Dual citizenship was not permitted except in certain rare cases where a person had dual citizenship from birth or childhood.

Like so many other societal norms, attitudes toward dual citizenship changed in the 1960s. Most of the laws forbidding dual citizenship were struck down in 1967 by the U.S. Supreme Court. The court ruling, in the case of *Afroyim v. Rusk*, involved a painter who tried to reclaim U.S. citizenship after he joined thousands of others in migrating to Israel. The *Afroyim* decision dealt specifically with the 14th Amendment's guarantee of citizenship to people "born or naturalized in the United States."

The 1967 ruling did not prohibit Congress from establishing prerequisites to naturalization. In particular, the Supreme Court left intact the requirement that new citizens must renounce their former citizenship during the naturalization ceremony.

Edwin S. Rubenstein *is president of ESR Research, Inc., a research organization focusing on public policy and economic trends. He was formerly Director of Research at the Hudson Institute.*

In practice, however, the government's attitude toward renunciation changed dramatically after 1967. The U.S. State Department – traditionally quite combative toward dual citizenship claims – no longer does anything in the vast majority of situations where a new citizen's "old country" refuses to recognize the U.S. renunciation.

The official State Department policy on dual citizenship today is that the United States does not favor it as a matter of policy because of various problems they feel it may cause, but the existence of dual citizenship is recognized in individual cases. That is, if a person asks State whether or not to become a dual citizen, they will recommend against it; but if you tell them you are a dual citizen, they'll usually say it's OK.

U.S. citizenship can be revoked if a person is deemed to have acted with the intent of giving it up. Thus foreign military service will result in loss of U.S. citizenship if: the person served as an officer or the foreign military force is engaged in hostilities against the U.S.; the service was voluntary; and (most importantly) the person intended to give up his U.S. citizenship.

Even foreign military service may not deprive someone of his U.S. citizenship. The current policy statement on foreign military service recognizes that dual citizens sometimes find themselves legally obligated to participate in the military forces of the other country, and can do so in such situations without endangering their U.S. status.

How Important Is the Issue?

Is dual citizenship really an issue for the United States? An examination of the numbers suggests it is. The latest official estimates (1999) of the number of foreign-born persons, of whatever legal status, living in the United States is 26.4 million. This is the largest foreign-born population in our history and represents a thirty percent rise (six million) over the 1990 figures. The inflow of immigrants in the 1980s and 1990s

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represents the largest consecutive two-decade influx of immigrants in the country's history.

INS figures for 1994-1998 show that 17 of the "top twenty" immigrant-sending countries allowed some form of multiple citizenship. Over that period 86% of the arrivals from these countries were multiple-citizenship immigrants. Although the State Department maintains no figures on the topic, some researchers estimate that as many as 25 million U.S. residents could hold dual citizenship.

Here is a breakdown by country of the largest groups of immigrants naturalized in 1999:

Mexico	207,750	Recognizes dual citizenship
Vietnam	53,316	Recognizes dual citizenship
Philippines	38,944	Considers person no longer Filipino but is considering change
China	38,409	Considers no longer Chinese
India	30,710	Considers no longer Indian, but bill pending in Parliament may change citizenship law
Jamaica	28,604	Recognizes dual citizenship
Cuba	25,467	Still considered Cuban by Cuba
Dominican Republic	23,089	Recognizes dual citizenship
El Salvador	22,991	Recognizes dual citizenship
Haiti	19,550	Recognizes limited dual citizenship

Dual Citizenship is The Rule, Not the Exception

Stanley Renshon, a professor of political science and a psychologist at City University in New York, identifies 92 countries (not including the United States) that allow some form of dual citizenship. Dual citizenship arises because each country makes its own laws respecting who is or is not its citizen, usually without regard to whether a given person is considered a citizen by one or more other countries.

Many countries do not recognize the renunciation of old citizenship that is part of the U.S. naturalization ceremony. An immigrant from such a country could be a dual citizen, as it were, in spite of himself.

Other countries (Canada, for example) require that someone who wants to give up his citizenship has to go to an embassy or consulate and sign a special form in the presence of officials. Since neither the INS nor the U.S. State Department makes immigrants from such countries actually do this, many naturalized citizens continue to exercise rights of citizenship in the former country as though nothing had happened.

Israel's "Law of Return" (under which any Jew may immigrate to and become a citizen of Israel) confers Israeli citizenship automatically, without the immigrant having to apply for it, attend any ceremony, or swear an oath of allegiance. The Israeli law may originally have been written this way to encourage American Jews to move to Israel; they could, in theory, argue that they had not explicitly requested Israeli citizenship and were thus still entitled to keep their U.S. citizenship.

The State Department used to take a dim view of such behavior if they found out about it, and people acting in this way were known to lose their U.S. citizenship on the grounds that their pledge to renounce their prior status had evidently not been made in good faith. Now, though, the State Department almost never pursues such cases.

More Nations Easing Dual Citizenship Laws

Foreign countries are increasingly encouraging expatriates to claim dual citizenship, hoping to capitalize on the political clout and financial resources of those who have built new lives abroad.

Australia changed its laws in April 2002 to allow its expatriates to remain citizens even if they wish to become a citizen of another country.

Mexico embraced dual citizenship in 1998. Until that time many Mexicans were reluctant to become U.S. citizens because they feared losing real estate, inheritances, or businesses in Mexico. The change in Mexican law gives Mexican immigrants the right to own property anywhere in Mexico and legal status to live and work there with rights equal to those of any other Mexican citizen. The only restriction is that they cannot vote or hold political office in Mexico.

Mexican President Vicente Fox wants to make the practice even more appealing with a pledge to allow dual citizens to vote in Mexican elections from the

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United States. Fox is hoping to spur dual citizens to dedicate their money to development projects in Mexico.

Such moves are sure to heighten the debate over whether dual citizenship is a healthy manifestation of cultural identity or a potentially dangerous watering-down of national loyalty.

Meanwhile, Mexico has launched an unprecedented outreach to U.S. citizens who were forced to renounce Mexican citizenship before dual citizenship was approved in 1998. About 160 attended the inaugural event in 2002, and the Mexican Consulate in Chicago has helped about 800 U.S. citizens regain Mexican citizenship this year.

Economics is also behind the dual-citizenship push in India. After a high-level committee on the Indian diaspora endorsed the practice, Indian officials are crafting a dual-citizenship law that will allow Indians in the United States to reclaim Indian citizenship, hold property, and make unrestricted investments back home.

Germany, Singapore, Austria, China, Japan, Korea, Denmark, and Malaysia are among countries which prohibit dual citizenship. In Singapore, for example, immigrants are required to produce documentary evidence of renunciation of foreign citizenship *before* taking the Oath of Renunciation. Several countries require an applicant for renunciation of citizenship to show he has sold or surrendered all his assets in the former country, has fulfilled his military service obligations, etc.

But even countries which formally disallow dual citizenship differ in how seriously they treat the renunciation requirement. Some countries treat their own naturalization oaths as essentially meaningless and take no steps to enforce them at all.

Pros and Cons

As a general rule, dual citizens are not entitled to any sort of special treatment by their two countries of citizenship. Each country will usually consider the person as if he were a citizen of that country alone. For example, if a "dual U.S. citizen" gets into some kind of legal trouble in the U.S., the U.S. will not acknowledge any efforts by consular officials of the other country of citizenship to intervene on the dual citizen's behalf.

Also, when a "dual citizen" enters the U.S., he/she is expected to identify himself to U.S. immigration and customs officials as a U.S. citizen (not as a citizen of some other country) – and in cases where a passport is required to enter the U.S., a dual U.S./other citizen is expected to enter on a U.S. passport, just like any other U.S. citizen.

Citizenship frequently carries with it legal obligations relating to taxes, military service, and/or travel restrictions. Again, since countries usually insist on dealing with their citizens without regard to any other citizenships they might hold, and tend to frame their laws regarding citizenship obligations without regard for the laws of other countries, a dual citizen could find that a country which considers him a citizen, but in which he does not live, expects him to pay taxes (possibly in addition to taxes he is already paying in his country of residence); considers him liable to be drafted into its army (even if he has already served or is currently serving in the other country's army); and may forbid him to travel to certain countries, including possibly his other country of citizenship. In practice, such situations are often smoothed over via tax treaties and the like, but conflicts *could* (and sometimes do) occur.

"Some countries treat their own naturalization oaths as essentially meaningless and take no steps to enforce them at all."

On the other hand, dual citizenship can have distinct advantages. Dual citizens of EU countries and the U.S., for example, can work anywhere in the European Union, a right unavailable to U.S.-only citizens.

The Irish Consulate in Chicago has seen growing demand for "citizenship by descent" which allows U.S. citizens to secure Irish citizenship merely by proving that one grandparent was Irish. Although many applicants want to reconnect with their heritage,

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others are driven by the desire to work in the European Union, according to Vice-Consul Caitriona Doyle.

"You have young people who see working in Ireland or Europe as attractive. If they take out an Irish passport, they can go right to work," Doyle said. (Oscar Avila, "Benefits Lure Many to Eye Dual Citizenship," *Chicago Tribune*, April 7, 2002.)

For others, citizenship opens the door for family reunifications. Du Dang of Vietnam said he is taking citizenship classes in Chamblee so that one day he can sponsor his wife, whom he hasn't seen in six years.

Still others want citizenship just to acquire a U.S. passport, which allows them ease of travel.

The Downside of Dual Citizenship

For the past decade America has debated immigration primarily along economic lines: Do immigrants cost the United States more than they contribute, or do they "pull their own financial weight?" More recently – in the post 9-11 world – national security has dominated the debate over immigration. We have seen a significant number of American citizens, naturalized as well as native-born, participate in the terrorist war against the United States.

"Although economics and national security are important, they may not be the most fundamental issues surrounding our immigration dilemma. These can be summed up in two terms: shared values and integration."

Although economics and national security are important, they may not be the most fundamental issues surrounding our immigration dilemma. These can be summed up in two terms: shared values and integration. Share values refers to the traditions, history, and ethical precepts that constitute the core foundation of a society, while "integration" refers to the degree to which different members of that society subscribe to those values. These two essential elements are fundamental for any well-functioning society.

Is it possible to be a fully engaged citizen of several countries? Is it possible to follow two or more different traditions? Is it possible to have two possibly conflicting core identifications and attachments? Probably not.

Professor Renshon sees the battle over dual citizenship as a skirmish in a wider culture war:

> *The idea that individuals can integrate multiple conflicting basic orientations towards life may well prove a form of cultural deceit. It is apparently easier for some in the privileged elite to disregard the primary attachments that most citizens have to their own countries and which the United States should and needs to as a matter of policy foster. In doing so, these people seem to have confused sophistication with a new form of modern rootlessness. Such people may go anywhere, but they belong nowhere.*

Immigrants increasingly view the United States as a place to earn a living rather than a society whose values and tradition they honor. Dual citizenship is a major factor in this deterioration of social awareness. Here is how Renshon describes the obstacles to cultural assimilation raised by dual citizenship:

> *America reached its present state of political, economic, and social development by providing enormous personal freedom and opportunity. In doing so, it leveraged personal ambition as a tool to transform individuals' socioeconomic circumstance, and in the process it helped develop and reinforce the very psychological elements and attachments that were consistent with personal success and civic freedoms in the United States.*
>
> *We have made the same tradeoff with new immigrants. We take immigrants in and take the chance that we can leverage their self-interest, which is entirely fine, and transform it into authentic commitment. Immigrants coming here agree to reorient themselves to their new*

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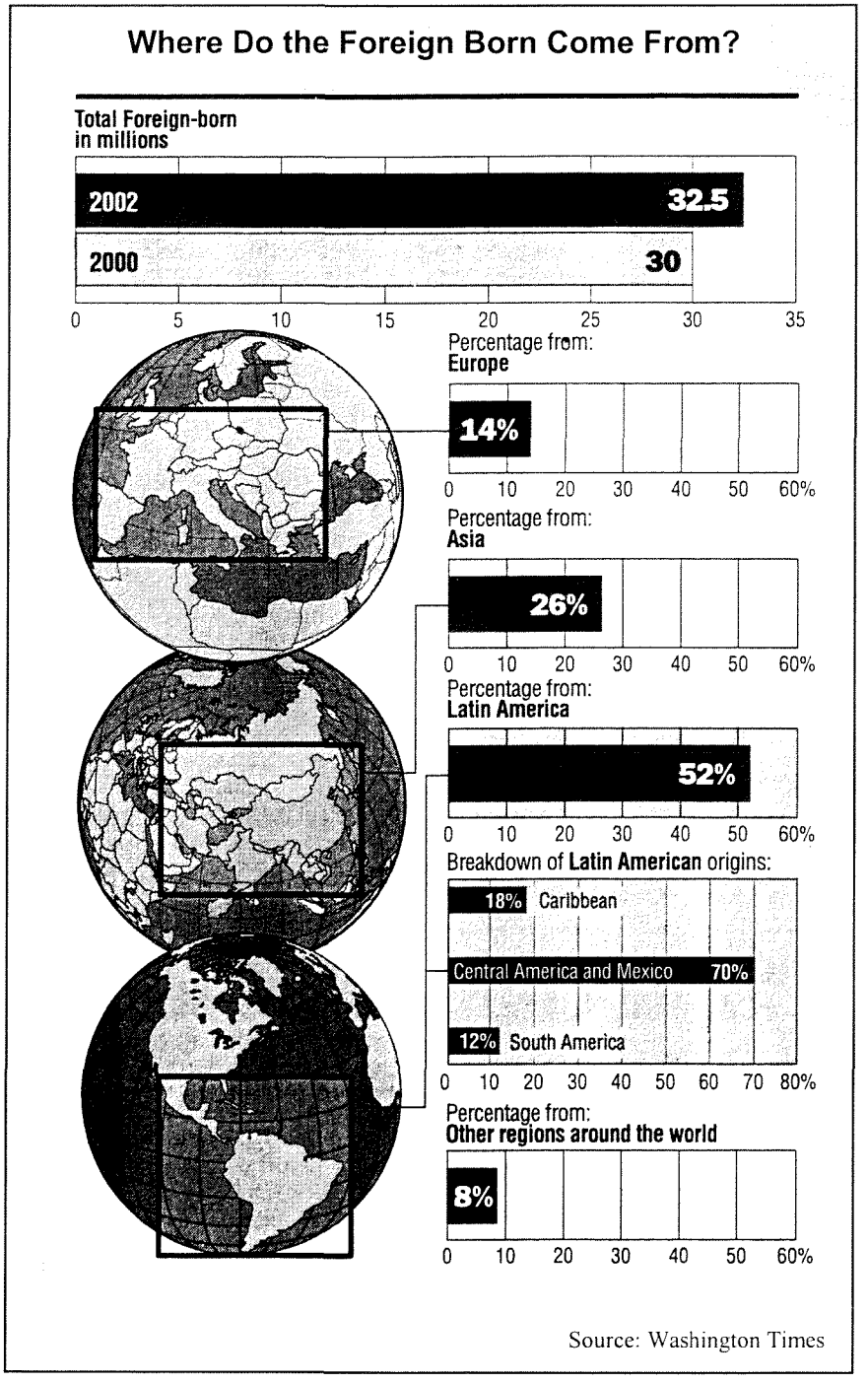
societies and away from their old one. This involves some basic things: learning to be at home with English, understanding the practices and institutions that define American culture and politics. As they are successful, immigrants can then reflect on the ways in which their particular search for freedom and opportunity fit in with the history, with all its vicissitudes good and bad, that have shaped the ideal and the promise of America.

Dual citizenship, by dividing the immigrant's attention and commitment, changes that traditional and successful recipe. Immigrants increasingly come from countries that encourage dual citizenship for their own self-interested purposes. It may be to ensure remittances. It may be to organize people here for policies that they want at home. Modern communication technologies abet this process.

These developments set the stage for a direct conflict of interests among new immigrants, many of whom retain deep attachment to their home country, and more long-term and traditional and integrated citizens. Given the distribution geographically of new immigrants, it is possible that whole states in the United States and certainly some localities will have a substantial portion of dual citizens with active and deep connections to their countries of origin and countries that are organizing to make use of those.

In a democracy, especially one facing issues of cultural coherence and integration, the costs of admitting and allowing large numbers of dual citizenship citizens with multiple loyalties and the increasing capacity to maintain those ties are not so favorable. In a time characterized by enormous worry about the decline of social capital, it's something that we ought to be thinking about.... ■


Where Do the Foreign Born Come From?
Total Foreign-born in millions
2002
32.5
2000
30
0 5 10 15 20 25 30 35
Percentage from: Europe
14%
0 10 20 30 40 50 60%
Percentage from: Asia
26%
0 10 20 30 40 50 60%
Percentage from: Latin America
52%
0 10 20 30 40 50 60%
Breakdown of Latin American origins:
18% Caribbean
Central America and Mexico 70%
12% South America
0 10 20 30 40 50 60 70 80%
Percentage from: Other regions around the world
8%
0 10 20 30 40 50 60%
Source: Washington Times

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An Arab Government In Europe?

So predicts Russia's 'Pravda'

by Don Barnett

The writers at *Pravda* are at it again predicting the demise of the West, but this time they may be on to something. The internet version of the paper (Pravda.ru), which features snowflakes and globes in the banner instead of a glowering Lenin, suggests that Belgium may soon become a Muslim country. The February 2, 2003 article, "Europe may soon have an Arab government," is translated as follows:

Europe may soon have an Arab government on territory now occupied by Belgium. Its official language will be Arabic and its religion – Islam.

The so-called European Arab League headed by Abou JahJah is demanding recognition of Arabs as an independent ethnic group on the same basis as other ethnic groups in Belgium as well as an Arab quota for government jobs and in institutions of learning. The League calls for recognition of Arabic as an official state language. [*Translator's note: There are already three official languages in Belgium – French, Dutch, and German.*]

The main goal of the League is to end official government policy that attempts to integrate Muslim immigrants into Belgian society.

Already today the streets of Antwerp are patrolled by a "citizens' militia" of black-clad young Moroccans guarding against anti-Muslim discrimination by police. Antwerp is the fourth largest port in the world and Belgium's richest city. The city is the world center of the diamond trade and boasts many wonders from Belgian royalty's past. It has the highest unemployment rate in the country at 15 percent compared to the national rate of 6 percent. It also happens to have the largest community of poor, uneducable Arabs in the country.

An international crisis erupted when a Flemish Belgian killed his neighbor, a Moroccan teacher. The incident triggered violent demonstrations and riots resulting in many arrests including that of Abou JahJah, known to have ties to Hezbollah. He was shortly released, whereupon he established the private Muslim militia in Antwerp.

The web site of the European Arab League overflows with anti-Semitic propaganda. Recently, arsonists attempted to burn down an Antwerp synagogue. The mostly Hasidic local Jewish community of 20,000 – one of the richest in Europe – specializes in the diamond trade and is concerned for the safety of Jews. Paradoxically for modern Europe, an unusual union has formed between the Jewish community and right-wing nationalists. In fact, the rightist leader, Philip De Venter has publicly vowed to protect the Antwerp Jewish community. The presence of the Arabs has meant that the rightists may win 40 percent of the votes in upcoming elections.

The nationalists demand retraction of citizenship from Arab immigrants who openly ignore the mores and culture of their host country.

Belgium is one of the first countries where the left has succeeded in bringing about a catastrophe with its short-sighted attempt to remake the cultural and ethnic landscape of Europe. ■

[*Translator's further note: Lenin must be cheering in his mausoleum.*]

Don Barnett *lived and worked in the former Soviet Union for two years and has written extensively on immigration issues. He is a frequent contributor to* The Social Contract.

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Alan Dershowitz Takes On the Terrorists

Book Review by Carl F. Horowitz

Is it possible from a civil-libertarian standpoint to support, in measured doses, the use of torture in obtaining a confession from a terrorist suspect? Even raising such a question, until recently, struck most Americans as odious. Yet since the attacks of September 11, 2001, and especially in the wake of the capture this year in Pakistan of al-Qaeda operations chief Khalid Shaik Mohammed, the putative mastermind of those (and other) attacks, it's hard to find someone who doesn't want to ventilate on the subject.

Mohammed's capture was part of a series of high-profile arrests, from London to Lackawanna, of Islamic terror cell members. What he tells the CIA, in addition to information stored in his computers, documents and cell phones, could prevent future atrocities and lead us to his boss, Osama bin Laden. Luckily, Mohammed has been accommodating. "He is giving up so much (information) that we can't scramble fast enough," reported one source. As it turns out, al-Qaeda is much closer than we thought to developing chemical and biological weapons. The CIA only had to employ sleep deprivation and temperature discomfort, at most mild forms of torture, to get Mohammed to talk. But suppose interrogators had to resort to severe techniques to get even rudimentary information. Legalized barbarism, right? Assume, then, an opposite scenario in which we err by omission and, refusing to consider torture of any sort, fail to prevent an act of terrorism costing hundreds of thousands, even millions, of lives. How would those sitting on their high moral dudgeon respond to *that*?

Why Terrorism Works: Understanding the Threat, Responding to the Challenge
by Alan M. Dershowitz
New Haven, CT: Yale Univ. Press
271 pages, $24.95

Alan Dershowitz, Harvard law professor and popular author, for at least a year has been hearing the word "crackpot" from his fellow civil libertarians for trying to get people to think hard about the ugly choices terrorists have forced us to make. With *Why Terrorism Works*, he has put forth a rigorous and honest appraisal of the nature and consequences of responding in different ways to the terror masters. He understands that responses to terrorism, like terrorism itself, can differ by degree as well as type. And while torture might *appear* a cure worse than the disease, no moral equivalence can exist between terrorists and nation-states acting to thwart their ambitions.

The problem with terrorism, put simply, is that it works. That is to say, terrorism has achieved extraordinary success as a diplomatic tool because we have allowed it to do so. Too often, when a terrorist sets off a grenade in a café or a bus terminal, leaders of the free world try to find in such acts expressions of legitimate grievances. If only we addressed the *root causes* of terrorism and negotiated with the terrorists, they imply, terrorists would refrain from inflicting further carnage. Such a response is a guaranteed recipe for surrender. "Every act of violence, criminality, and evil has root causes," writes Dershowitz. "By addressing and fixing the root causes of a *particular* terrorist group, we may sometimes ... reduce or eliminate the terrorist threat of that group ... But in doing so, we encourage other potential terrorists to resort to this unacceptable means of having their root causes addressed and fixed." Enabling Palestinian terrorists to enter the halls of power during the '70s boosted the confidence levels of contemporaries such as the Red Brigades and the IRA,

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and virtually assured the rise of Islamic fundamentalist monstrosities such as Hamas, Hezbollah and al-Qaeda.

The age of terrorism as an instrument of foreign policy began on July 22, 1968, notes Dershowitz, when three armed terrorists belonging to the Popular Front for the Liberation of Palestine hijacked an Israeli jetliner from Rome to Tel Aviv. The terrorists commandeered the plane to Algiers, and held passengers and crew hostage for five weeks. They released the hostages after negotiating the release of their comrades from Israeli prison, plus winning their own immunity. It was a public-relations coup that quickly led to similar acts, worst of all the massacre of Israeli athletes by Palestinian terrorists at the 1972 Summer Olympics in Munich. Despite the Israeli government's eventual hunting down and killing of escaped perpetrators, terrorism won the day. The Black September group, which carried out the massacre, took note of West Germany's – and the world's – timorousness. "The choice of the Olympics, from the purely propagandistic standpoint, was 100 percent successful," noted a group communique. "It was like painting the name of Palestine on a mountain that can be seen from the four corners of the earth." How contagious was government timidity? Of the 204 terrorists arrested outside the Middle East during 1968-75 only three remained in prison by the end of that period. Very often European governments happily released terror suspects immediately after a brief "interrogation." The UN General Assembly, for its part, welcomed PLO Chairman Yasser Arafat as a guest speaker and conferred observer status upon his organization.

"The insistence by terrorists that we adapt to their demands bears more than a passing resemblance to the lectures on our obligation to adapt to 'inevitable' Third World mass immigration."

This passivity established a pattern that continues to this day, raising the issue of why civilized peoples insist on reading reasonable intentions into terrorist acts. Anti-Americanism, hatred of Israel, and radical Third World anti-colonialism each offer some measure of explanation. Yet even taken together, a complete picture seems to be lacking. Dershowitz, a superb amateur psychologist as well as constitutional scholar, provides the missing link: the Stockholm Syndrome. In this scenario, hostages bond with their captors, and resist rescue, while the predators glow with invulnerability.

Sovereign nations in America, Europe, and elsewhere would seem as much subject to this syndrome as bank tellers or airline passengers. It is easy here in the U.S. to forget how many liberals in high positions during the late '60s and early '70s lauded the Black Panthers and the SDS Weathermen as noble, if misguided, messengers "trying to tell us something." It is likewise easy to forget that far-right paramilitary groups, such as the Michigan Militia, strutted like peacocks immediately after the April 1995 Oklahoma City federal building bombing, knowing they were receiving aid and comfort from above. Then-House Speaker Newt Gingrich actually refused to allow Rep. (now Sen.) Charles Schumer, D-N.Y., to hold an official hearing on the dangers of the militia movement. Popular support for terrorists almost inevitably reaches a pinnacle when they win. Osama bin Laden likes to put it this way: "People prefer a strong horse to a weak horse."

Jean Raspail's classic novel, *The Camp of the Saints*, comes to mind. The insistence by terrorists that we adapt to *their* demands bears more than a passing resemblance to the lectures from the high priests of Diversity on our obligation to adapt to "inevitable" Third World mass immigration. As terrorists cannot be convinced to change their tactics any more than their beliefs, liberty-loving nations must avail themselves of this national Stockholm Syndrome, or what Canadian columnist Mark Steyn likes to call "Battered Westerner Syndrome." The issue is not whether to crush terrorism, but how.

The U.S. conceivably could strike back at terrorism, argues Dershowitz, by emulating police states such as Egypt and Jordan, whose governments rarely lose sleep over such concepts as due process,

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reasonable search and seizure, and freedom of the press. We *could* institute tight media censorship, restriction of internal movement by citizens, monitoring of all phone, e-mail and other communications, punishment of family members of terror suspects, secret military tribunals, and torture. As much as one hates to admit it, even torture – the hard-core kind – can foil a plot, hence the temptation to employ it almost indiscriminately. In 1995, for example, police in the Philippines captured a terrorist, and tortured him into confessing his role in a plot to assassinate the pope, crash eleven commercial jetliners into the Pacific Ocean, and ram a Cessna plane armed with explosives into CIA headquarters. Authorities for weeks beat, and broke, the suspect's ribs with a chair and a long piece of wood, forced water into his mouth, and crushed lighted cigarettes into his private parts until they got the lifesaving information, and turned him over to the U.S.

Dershowitz knows that by making such methods of confession routine we would cease to be a free people. Such a policy would bring no guarantee of results either. Some terror suspects will not crack no matter how far pushed; others may give false information to avert further punishment; still others may not be terrorists at all. So we have to consider context. Do we apply the same methods to a bit player like John Walker Lindh as to a key al-Qaeda operative? How can we be certain a suspect is being truthful? And at what point do we cease torturing a suspect, sensing that further efforts may be fatal as well as futile? Such questions don't yield quick answers. But in getting Americans at least to think in such terms, Dershowitz has taken a major step in explaining why the choice before us is *not* creating a police state vs. living in constant fear of becoming terror victims.

A sensible strategy to combat terrorism, one that respects the rights of the innocent, must make terrorists and their allies alone pay the price, the author argues. Many terrorists are rational enough to engage in a rough cost-benefit calculation of the certainty and severity of punishment, and as such can be deterred through such measures as tighter border controls and mandatory national ID cards. When we make terrorism too risky to get away with, those contemplating it often will not get beyond the talking stage. Other terrorists, however, fueled by maddened, apocalyptic visions of child sacrifice and mass murder as fulfilling a heavenly mandate, likely won't be dissuaded by policy changes. For them, Dershowitz advocates assassinating terrorist leaders rather than bombing terrorist enclaves, as the latter might inflict heavy civilian losses.

While Dershowitz lays out a commendable course of action, it's what he omits – the possibilities for immigration restriction – that is his key shortcoming. He fails to grasp that terrorism has occurred on our soil because our lax post-1965 immigration policy allowed terrorists and many sympathizers to get in. He also supports another round of amnesty for illegal immigrants, citing as a reason that good citizens often are descended from those who enter under suspicious circumstances. Indisputably, this is so. But is admitting potential terrorists worth the gamble because their progeny might become model Americans? Common sense and experience would dictate otherwise.

"[Dershowitz] fails to grasp that terrorism has occurred on our soil because our post-1965 immigration policy allowed terrorists to get in."

That said, *Why Terrorism Works* remains a convincing brief for protecting the civilized world. Terrorists are both evil and powerful, and thus must be overpowered; negotiation only emboldens them. Few understand this as well as Dershowitz. But even the best-conceived set of deterrents and punishments may achieve only modest success if we fail to place curbs on entry by the foreign-born. All of the 9/11 hijackers came here legally on temporary visas, and blended easily into established Islamic Arab communities. There is no question al-Qaeda has a sizable share of sympathizers in the United States. Had we more carefully vetted potential entrants, all this talk of torture – not to mention the current reality of war against Iraq – might not exist. ■

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Downplaying the Immigration Factor

Book Review by Wayne Lutton

When it comes to immigration-related issues, the media pours out a steady stream of heart-warming stories of men and women who by the dint of hard work, perhaps unusual intelligence, and a bit of good luck, overcome hardships and come to "live the American dream." I don't doubt that there really are many such cases. But the "downside" to the immigration policies in force over the past three decades or more rarely gets mentioned, at least in the mainstream press.

The nexus between unselective immigration and crime is one of the "inconvenient" themes rarely given the attention it deserves. On the contrary, ethnic "Diversity" is always portrayed as a good thing and locales with lots of unrelated groups squeezed into a given territory are described as enjoying a "*rich* Diversity."

Not long ago I heard the editor of *Gangs in America*, C. Ronald Huff, Professor of Criminology at the University of California at Irvine, discussing gang wars in greater Los Angeles during a news program, prompting me to take a look at the latest edition of a book that first appeared in 1991. This third edition includes 18 new articles written by 29 contributors – all of whom come out of law enforcement and/or academic backgrounds.

There is less useful information here than one would expect in a book of over 300 pages that costs $44.95 retail (I borrowed the university library copy). I will pass along some of the points I found to be of interest.

Gangs In America
(Third Edition)
C. Ronald Huff, ed.
Thousand Oaks, CA:
Sage Publications
332 pages, $44.95

As most of us know, at least intuitively, there has indeed been an explosive growth in the number of gangs over the past twenty years. The latest National Youth Gang Survey, which polls law enforcement jurisdictions across the country, counted 26,000 gangs with a total enrollment of around 850,000 members at any given time. Gangs are no longer just a "big city problem," but this variety of criminal enterprise has extended to smaller communities as well. In the West, 72 percent of the reporting jurisdictions described extensive gang activity, as did 48 percent in the Midwest and South, and 29 percent in the Northeastern states.

The first chapter, "The Changing Boundaries of Youth Gangs," by James Howell, John Moore, and Arlen Egley, provides some basic data:

Age: Gang members tend to be older than they used to be, with 63 percent estimated to be young adults and only 37 percent juveniles.

Gender: Girls and young women form a larger percentage of gangs than in previous generations. A 1997 survey found that 38 percent of gang members were female. Most were very young. Females tend to leave gang life earlier than males do.

Race and Ethnicity: A hundred years ago, large proportions of gang members were White. By the late 1970s, about 80 percent of all gang members were Black or Hispanic. Nationwide, among 12-to-16 year old males, 2 percent of White youths, 6 percent of Black youths, and 5 percent of Hispanic youths reported some association with gangs. The corresponding percentages for females were 1 percent White, 2 percent Black, and 2 percent Hispanic.

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The 1999 Youth Gang Survey disclosed that 47percent of gang members are Hispanic; 31 percent are Black; 13 percent White, 7 percent Asian, and 2 percent "other." The author's don't go on to note that this does confirm that criminal gang activity is much more prevalent among Hispanics and Blacks than it is among Whites, since Hispanics now make up around 13 percent of the U.S. population, Blacks 12 percent.

Level of Organization: Some are well organized, and others are not. In Chicago, the Gangster Disciples are far better organized than are the Latin Kings. Some gangs are spreading tentacles across the country. Others try and fight turf wars.

Gangs in Late Onset Localities: Here the authors note, "A new generation of youth gangs has emerged. The Overwhelming majority of gang problem localities first experienced the emergence of gangs within the past 15 years." Of the locales reporting gang problems by the late 1990s, 87 percent said the onset occurred during the previous ten years.

John Hagedorn discusses, "Gangs and the Informal Economy." While drug sales are a major source of income for all gangs, "Latino drug sellers were more likely still to be drug users, consistent with more regular drug use by Latinos in our earlier studies." Hmmm. But hasn't President Bush praised them for their "strong family values"?

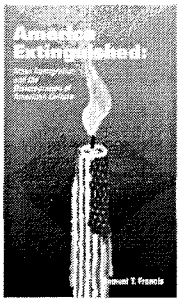
James Meeker and Bryan Vila discuss the challenge of collecting data on gangs. They point out that many "ethnic leaders" do not want to document the extent of gang activity and "community groups" often object to collecting crime data, since they claim such information leads to "ethnic profiling."

Part 3 of the book, dealing with "The Increasing Diversity of Gangs," points out that as Whites have fled Los Angeles and other metropolitan areas experiencing high levels of non-White immigration, Mexican, Central American, and Asian gangs have become entrenched.

Many of the contributions are littered with sociological jargon ("multiple marginality" and "racism and cultural repression" are two of the favorites) that does little to focus on the key issues that should be seriously considered here. However, Jody Miller, an assistant professor of criminology at the University of Missouri-St. Louis, does touch on an important point in her discussion of "Girls in the Gang." In earlier generations, gang members could opt-out, and find alternative sources of income and support, since there were relatively well-paying, often unionized factory jobs, located in major metropolitan areas. De-industrialization, with good jobs deliberately sent overseas, has resulted in deteriorating hiring conditions. Today, for youngsters who are not particularly bright or motivated, there are fewer sound alternatives to gang membership and welfare use than there were before "Free Trade" and NAFTA transformed one-time centers of industry into economic ghost towns.

All of the authors make policy recommendations, many of which are oh so predictable (viz. fight "racism" and poverty; "intervene" early, etc.). Not one of them suggests that immigration should be reduced; that maybe "Diversity" is not always and everywhere a good thing and that less "Diversity" might actually result in less tension. De-industrializing the American economy, while at the same time importing hundreds of thousands of unskilled people who simply haven't the intelligence and temperament to accomplish a whole lot under the best of conditions, seems to be a recipe for the sort of unfolding disaster we witness in greater Los Angeles and other destinations of preference for non-Western immigrants. ■

America Extinguished:
Mass Immigration and the Disintegration of American Culture
by Samuel Francis



Americans for Immigration Control
215 pages, $6.95

In this collection of insightful columns, Sam Francis illuminates many of the political realities surrounding mass immigration, unmasking the motives of the political and business interests responsible for the crisis we are in.

Available from The Social Contract Press at:
1-800-352-4843

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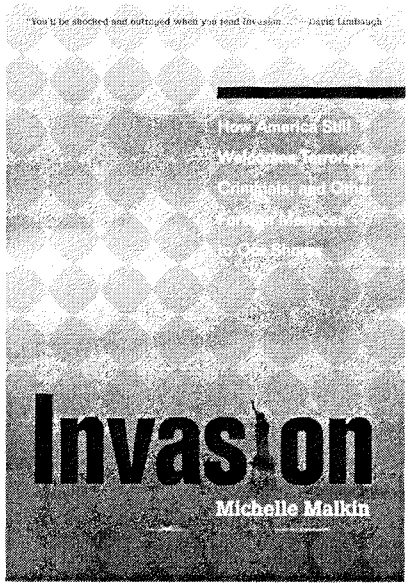
Invasion:

How America Still Welcomes Terrorists, Criminals, and Other Foreign Menaces to Our Shores

by Michelle Malkin



Invasion is a shocking exposé of how America's lax immigration system led to the September 11 terrorist attacks. Malkin, one of America's most important young journalists and a first generation American of Filipino descent, shows how every component of our immigration system failed: from kowtowing to consular offices, to unguarded borders and ports of entry, to toothless detention and deportation policies.

Malkin's conclusions and recommendations are stark and no-nonsense. But so is the job of protecting American lives. If you are ready for the blood-boiling truth about the dangers we face inside our own borders, no other book tells it like *Invasion.*

Ms. Malkin is not timid. She writes clearly and without apologies. She points fingers and goes after her targets. No hedging, no evasiveness here. She has studied her subject and organized her exposé for maximum comprehension and effect.

— Gerda Bikales in her review in *The Social Contract*
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